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Inoue et al.

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(54) **BICYCLE PEDAL**

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(51) **Int. Cl.**
B62M 3/08 (2006.01)

(52) **U.S. Cl.**
CPC ***B62M 3/086*** (2013.01)

(58) **Field of Classification Search**
CPC ... B62M 3/08; B62M 3/086; Y10T 74/2168; Y10T 74/217
See application file for complete search history.

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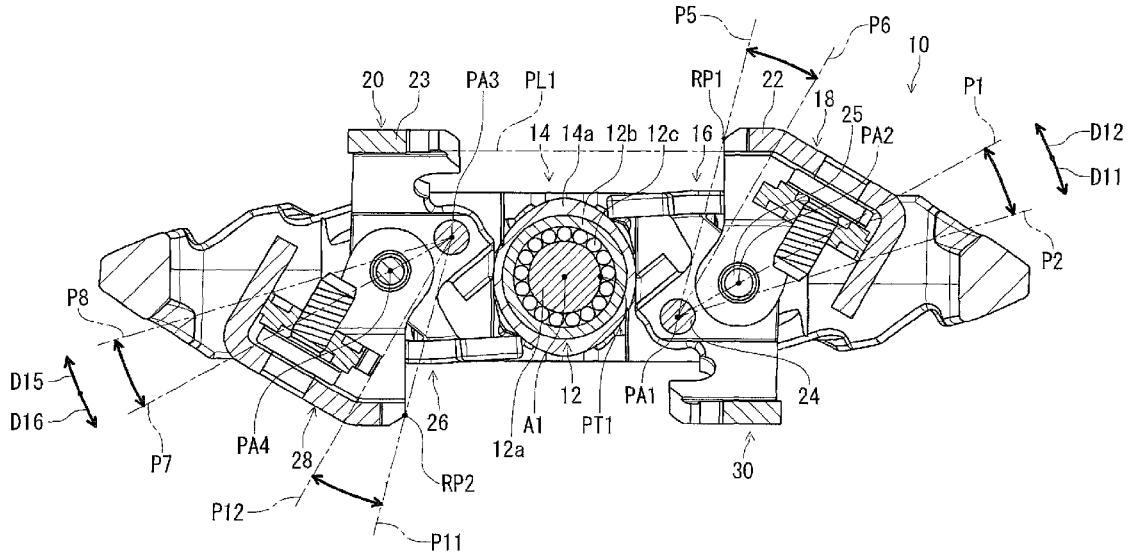
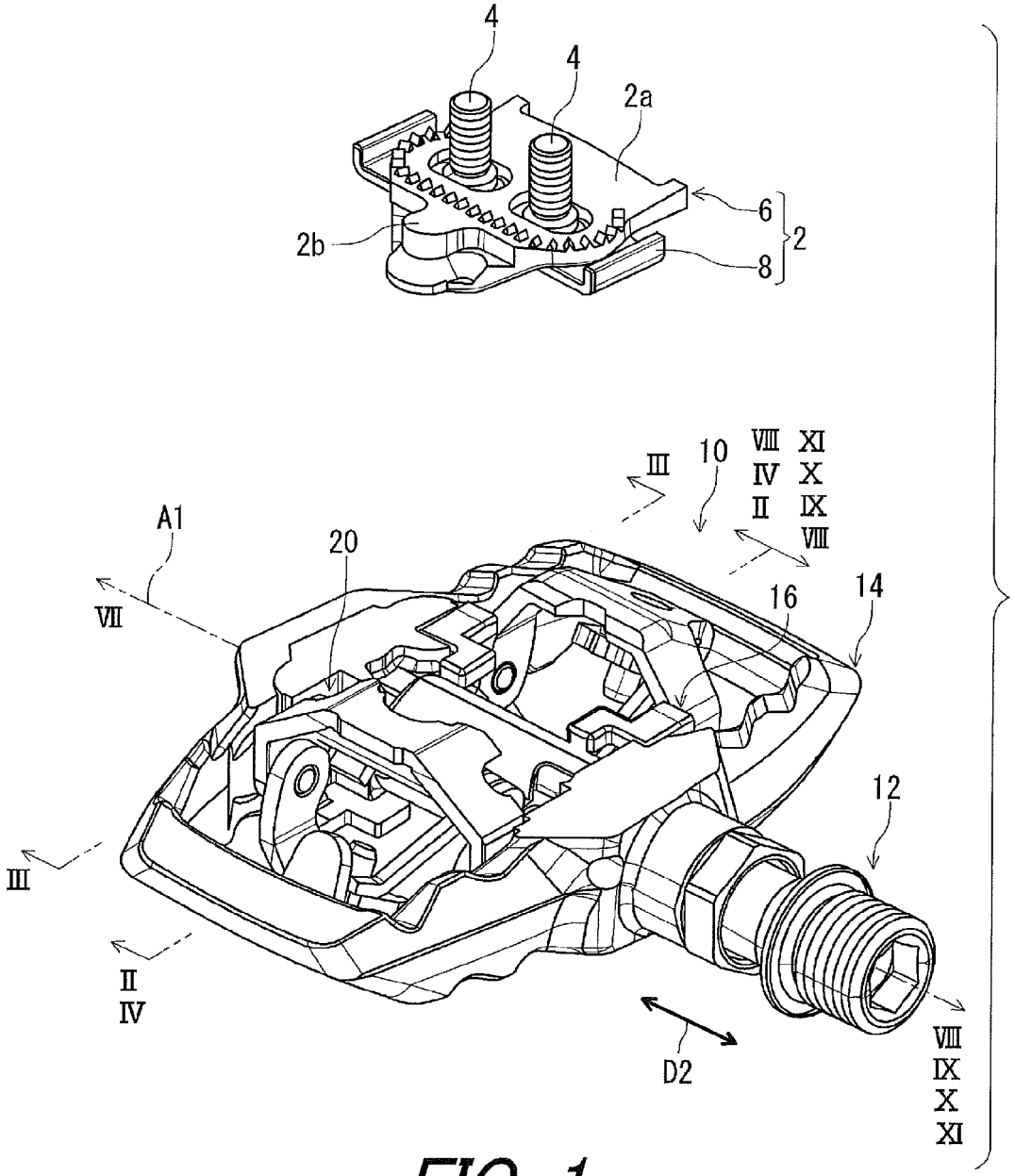
Primary Examiner — Thomas Diaz
(74) *Attorney, Agent, or Firm* — Mori & Ward, LLP

(57) **ABSTRACT**

A bicycle pedal comprises a pedal axle, a pedal body, a first sub member, a first clamping member, a second clamping member, and a biasing structure. The first sub member is movable relative to the pedal body about a first pivot axis in a first pivot direction and a second pivot direction opposite to the first pivot direction. The first clamping member is movable relative to the first sub member about a second pivot axis substantially parallel to the first pivot axis in a third pivot direction and a fourth pivot direction opposite to the third pivot direction. The first pivot axis is closer to a point on the pedal axle than the second pivot axis when viewed from an axial direction parallel to the first pivot axis.

22 Claims, 27 Drawing Sheets

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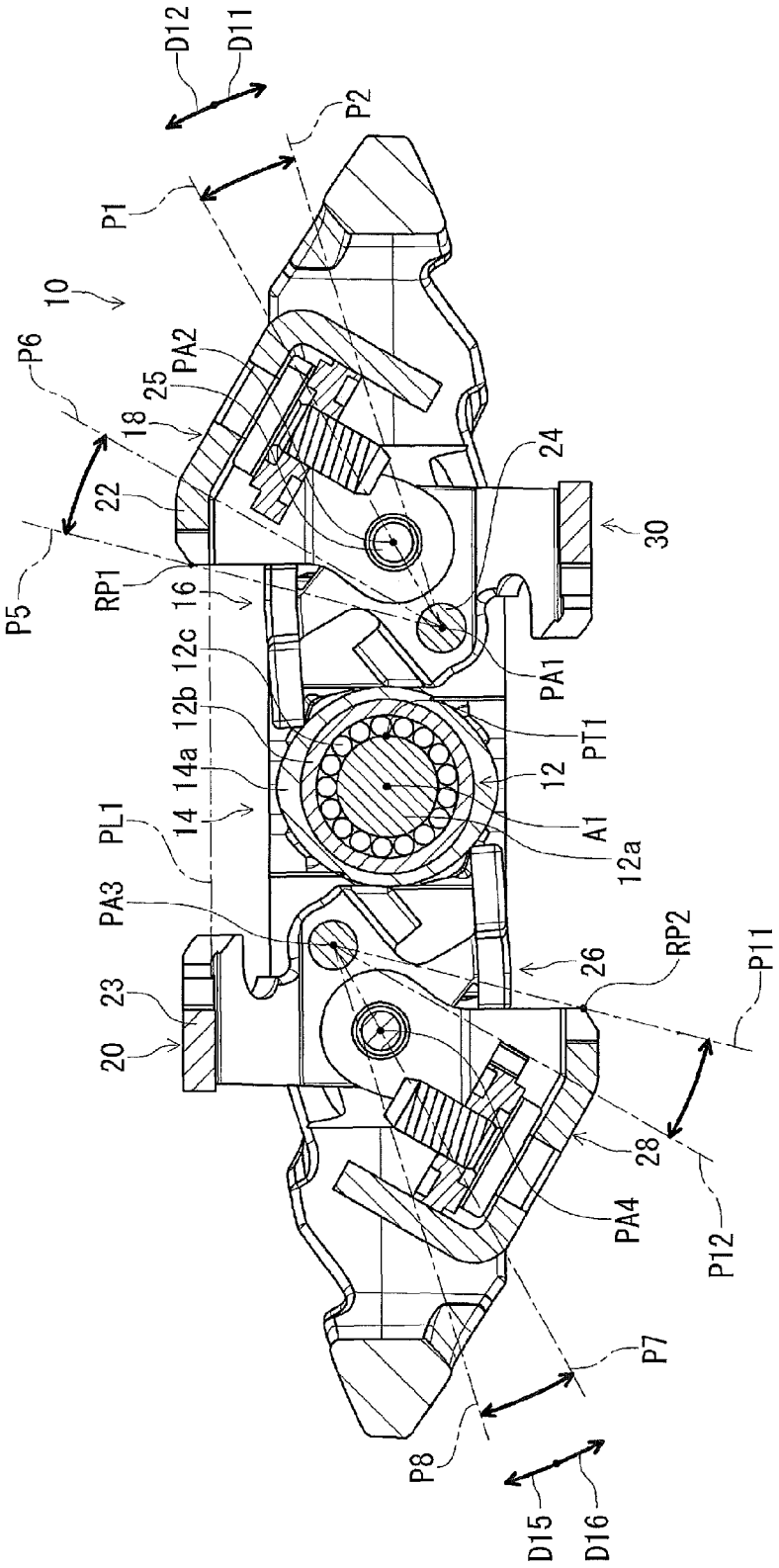
4
2a
6
2
2b
8
III
10
VIII XI
IV X
II IX
VIII
A1
20
VII
16
14
12
III
II
IV
D2
VIII
IX
X
XI

FIG. 1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D11
P2
P1
10
P6
PA2
25
18
22
24
30
P5
RP1
16
12c
12b
14a
14
PL1
PA3
23
20
PA1
PT1
12
A1
12a
26
RP2
P11
28
PA4
P12
P7
P8
D15
D16

FIG. 2

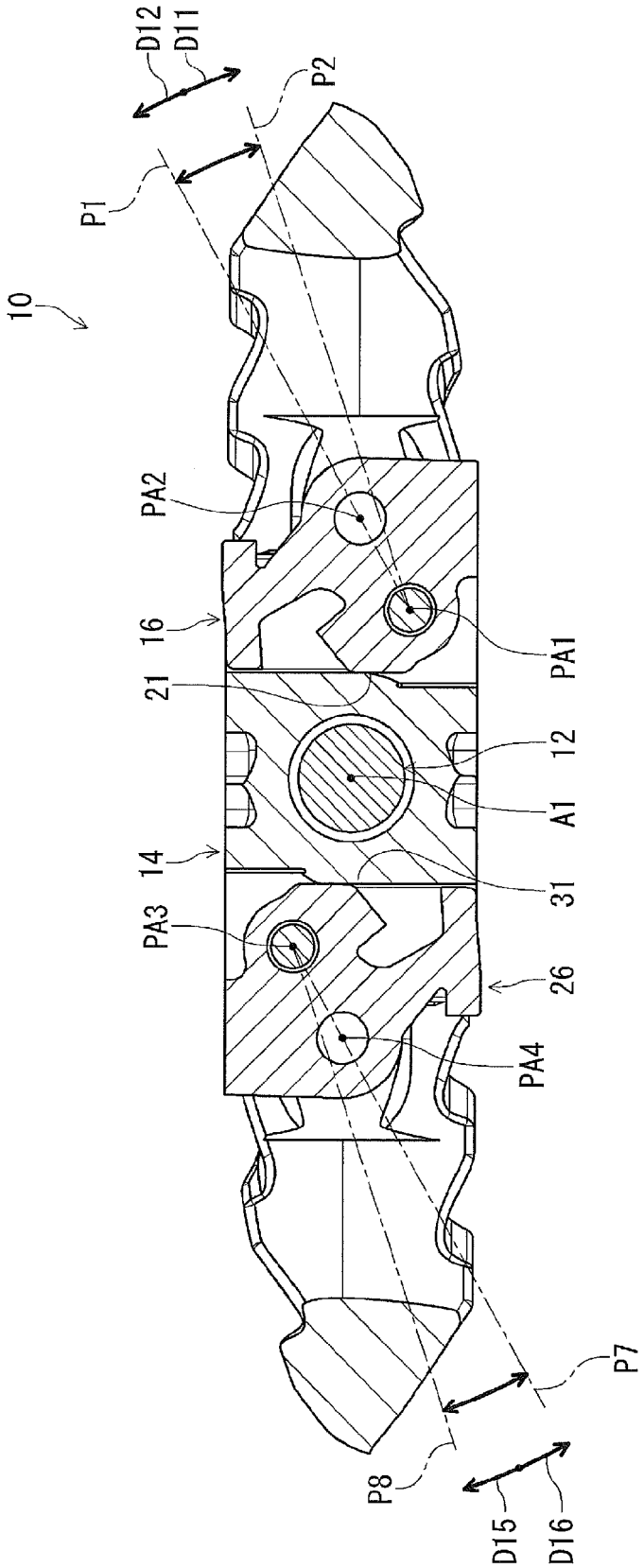
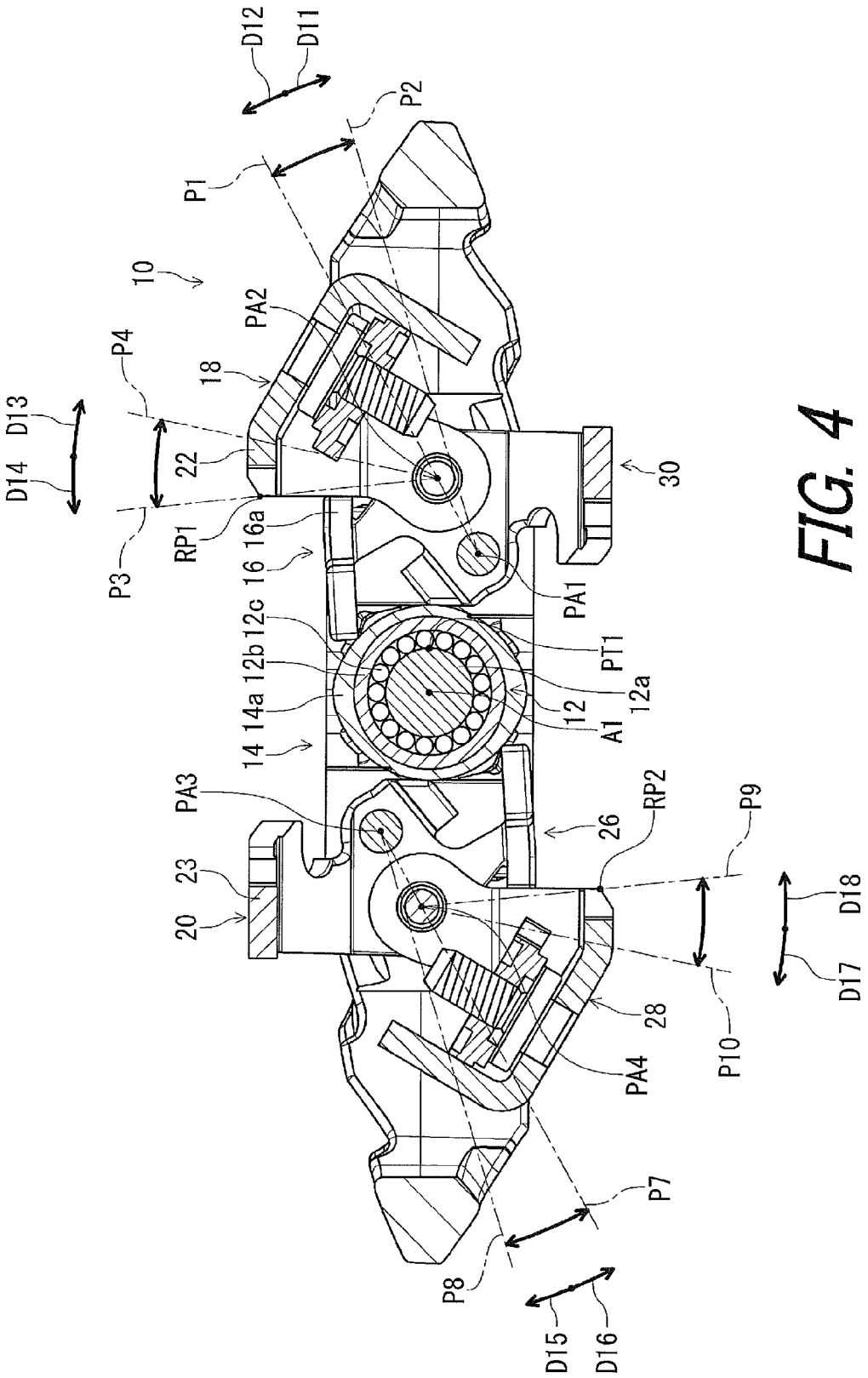


FIG. 3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D11
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P1
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PA2
P4
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D13
D14
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RP1
P3
16a
16
12c
12b
14a
14
PA3
23
20
PA1
30
PT1
12
12a
A1
26
RP2
P9
D18
D17
28
P10
PA4
P7
P8
D15
D16

FIG. 4

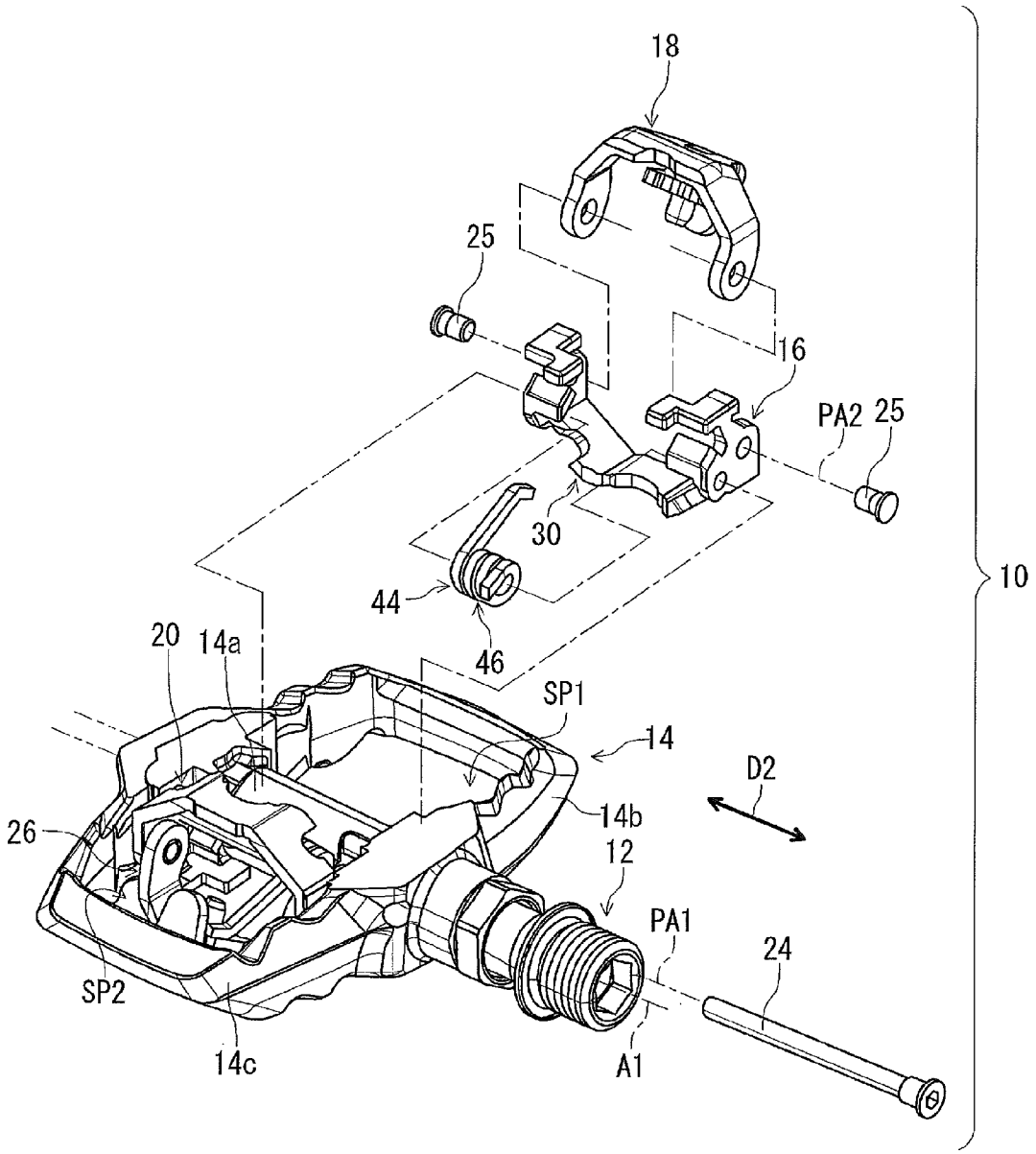

18
25
16
PA2
25
30
44
46
10
20
14a
SP1
14
D2
14b
26
12
PA1
24
SP2
14c
A1

FIG. 5

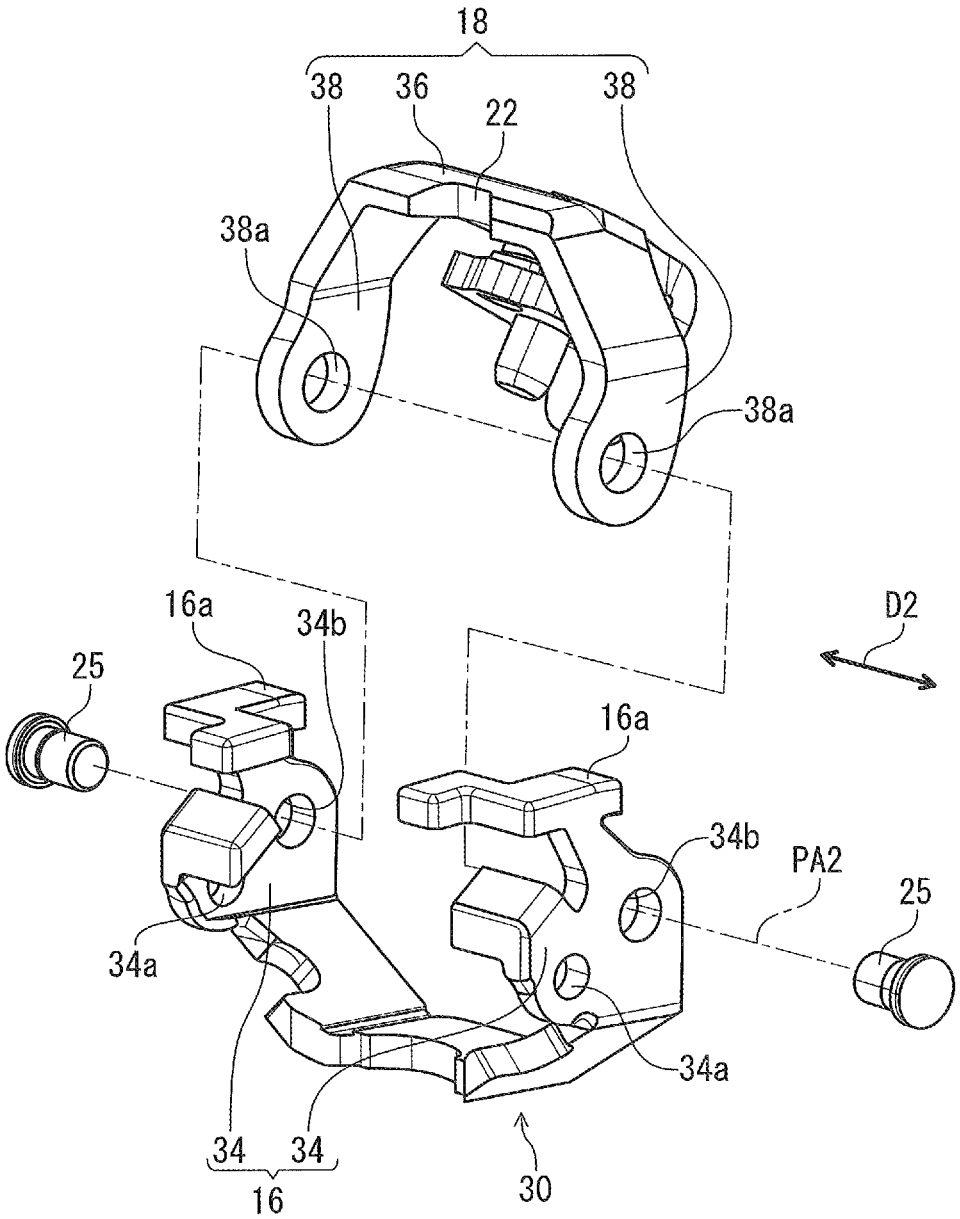

18
38
36
22
38
38a
38a
16a
34b
25
D2
16a
34b
PA2
25
34a
34a
34
34
16
30

FIG. 6

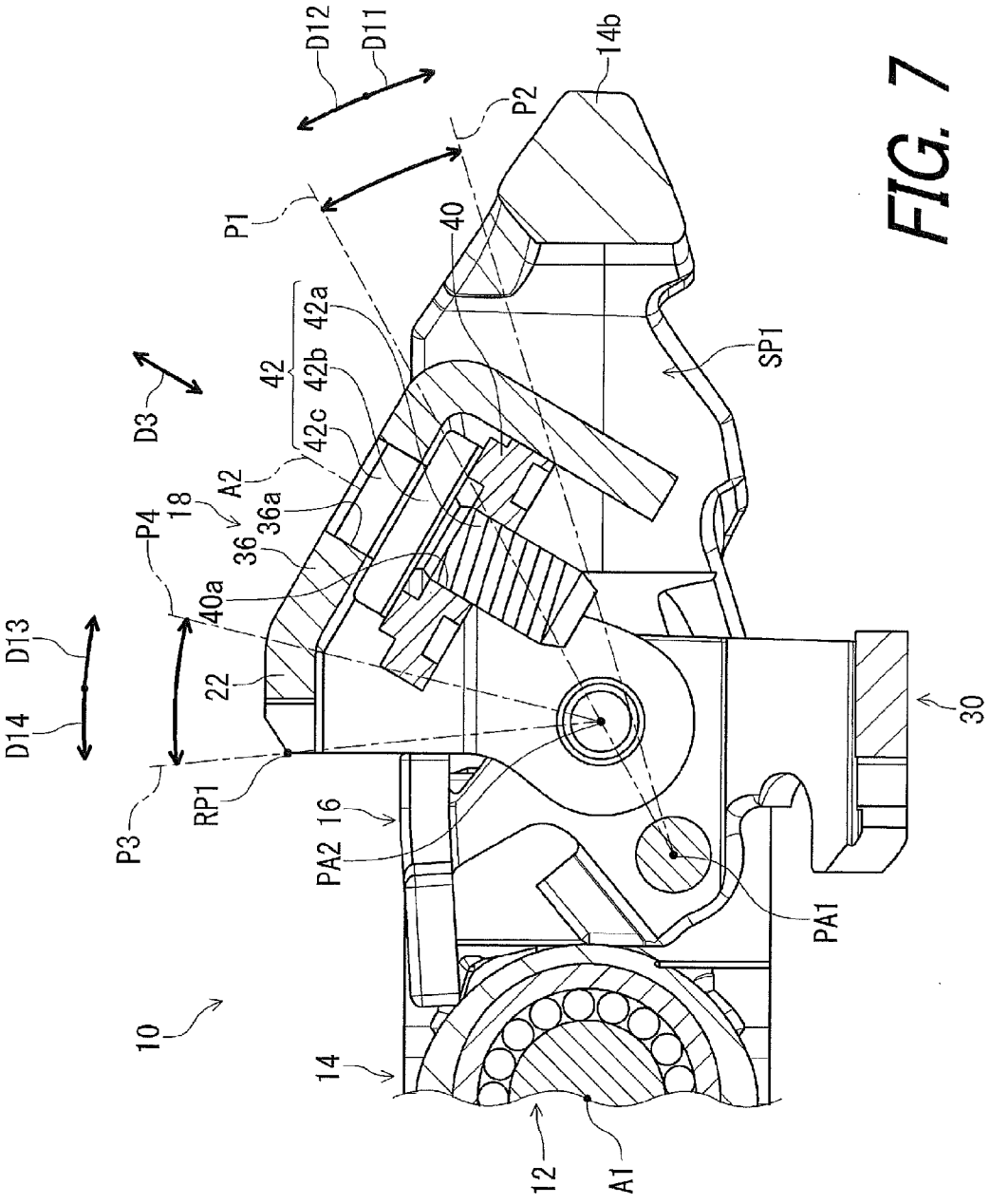

D12
D11
14b
P2
P1
40
42a
42
42b
42c
SP1
D3
A2
18
36a
36
P4
40a
22
D13
D14
30
RP1
P3
PA2
16
PA1
10
14
12
A1

FIG. 7

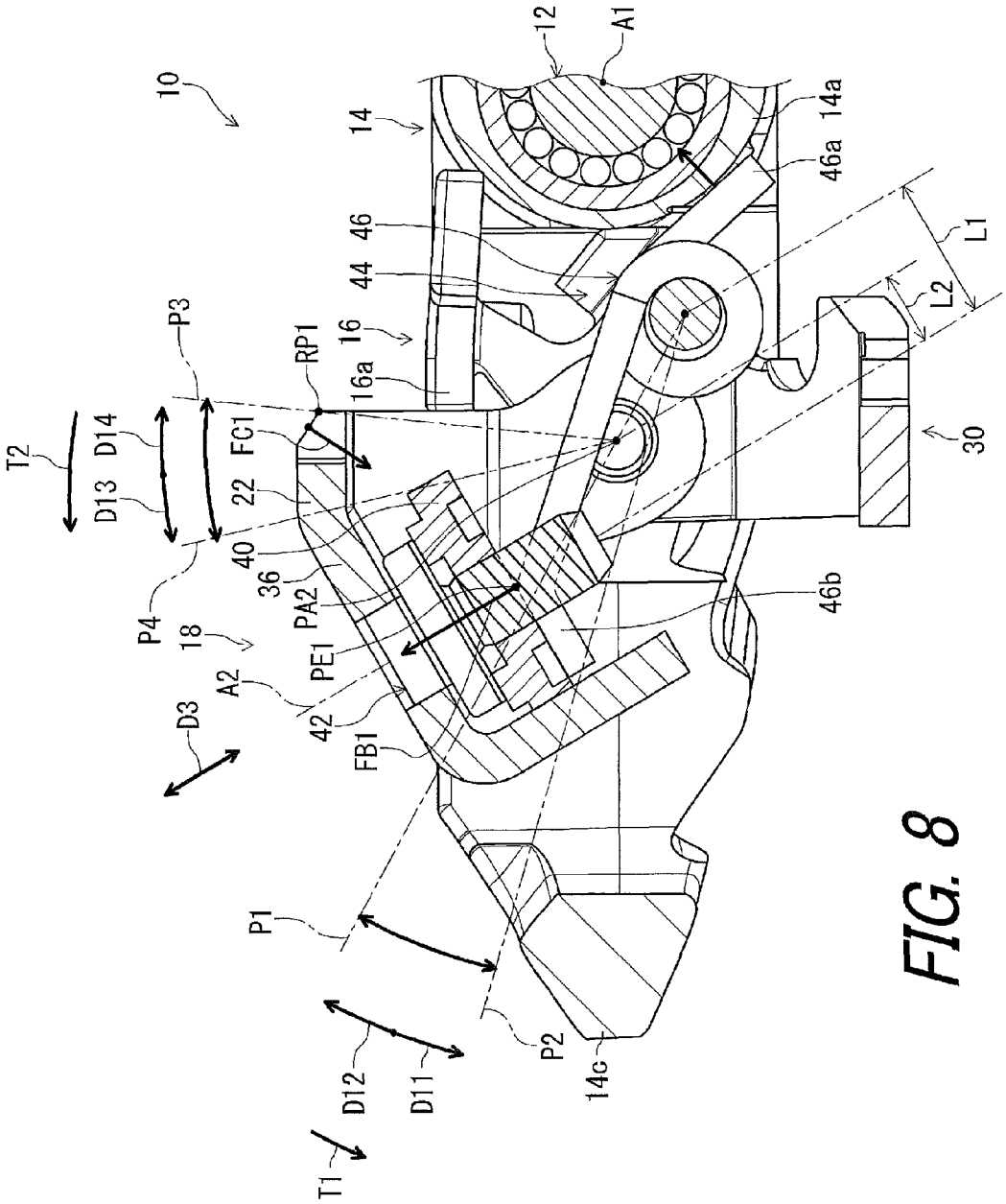

10
12
A1
14
14a
46a
46
44
L1
L2
30
P3
RP1
16
16a
T2
D14
D13
FC1
22
40
36
PA2
PE1
P4
18
A2
42
FB1
D3
46b
P1
D12
D11
T1
P2
14c

FIG. 8

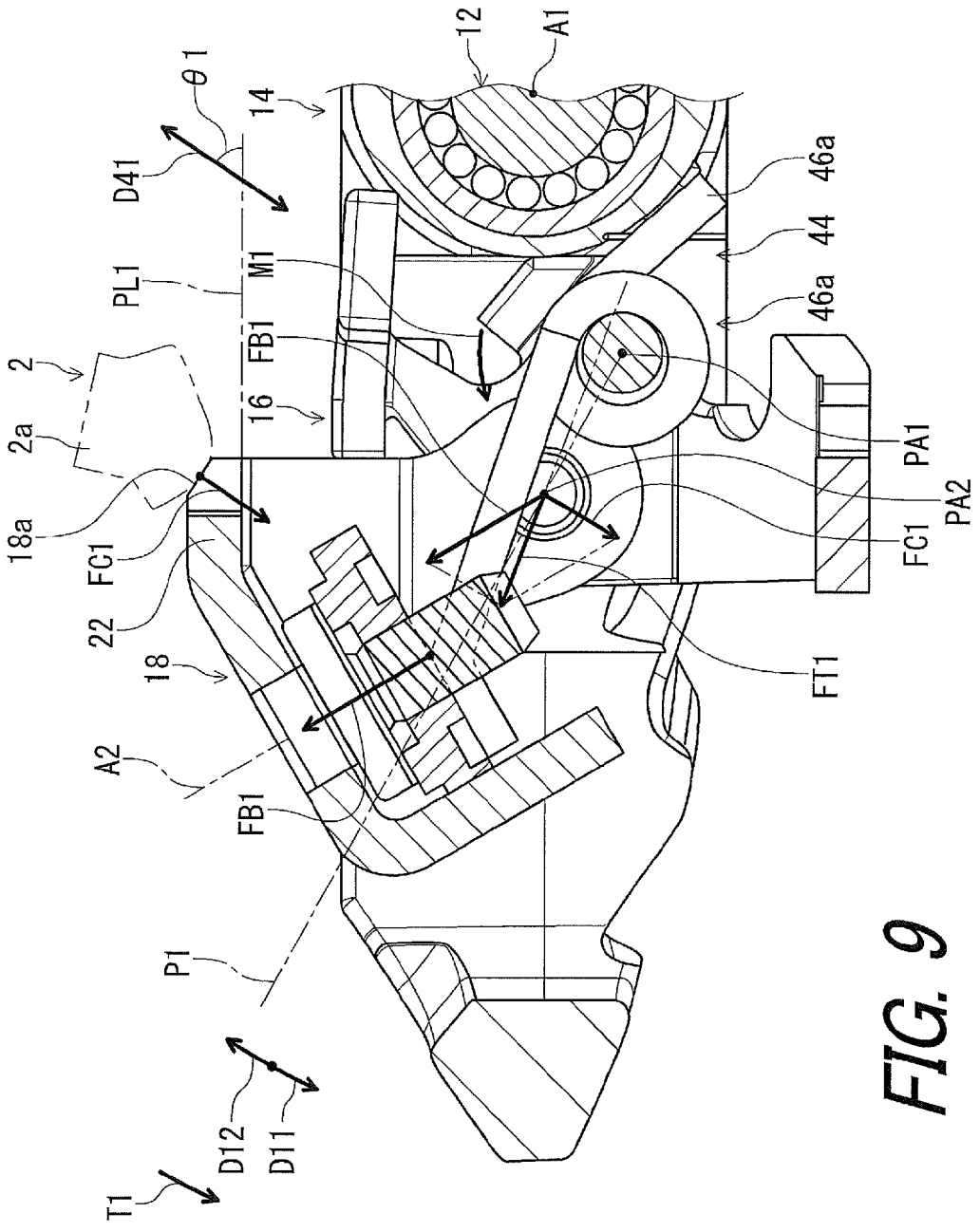

12
A1
θ1
14
D41
46a
44
PL1
M1
46a
FB1
2
16
PA1
2a
PA2
18a
FC1
FC1
22
18
FT1
A2
FB1
P1
D12
D11
T1

FIG. 9

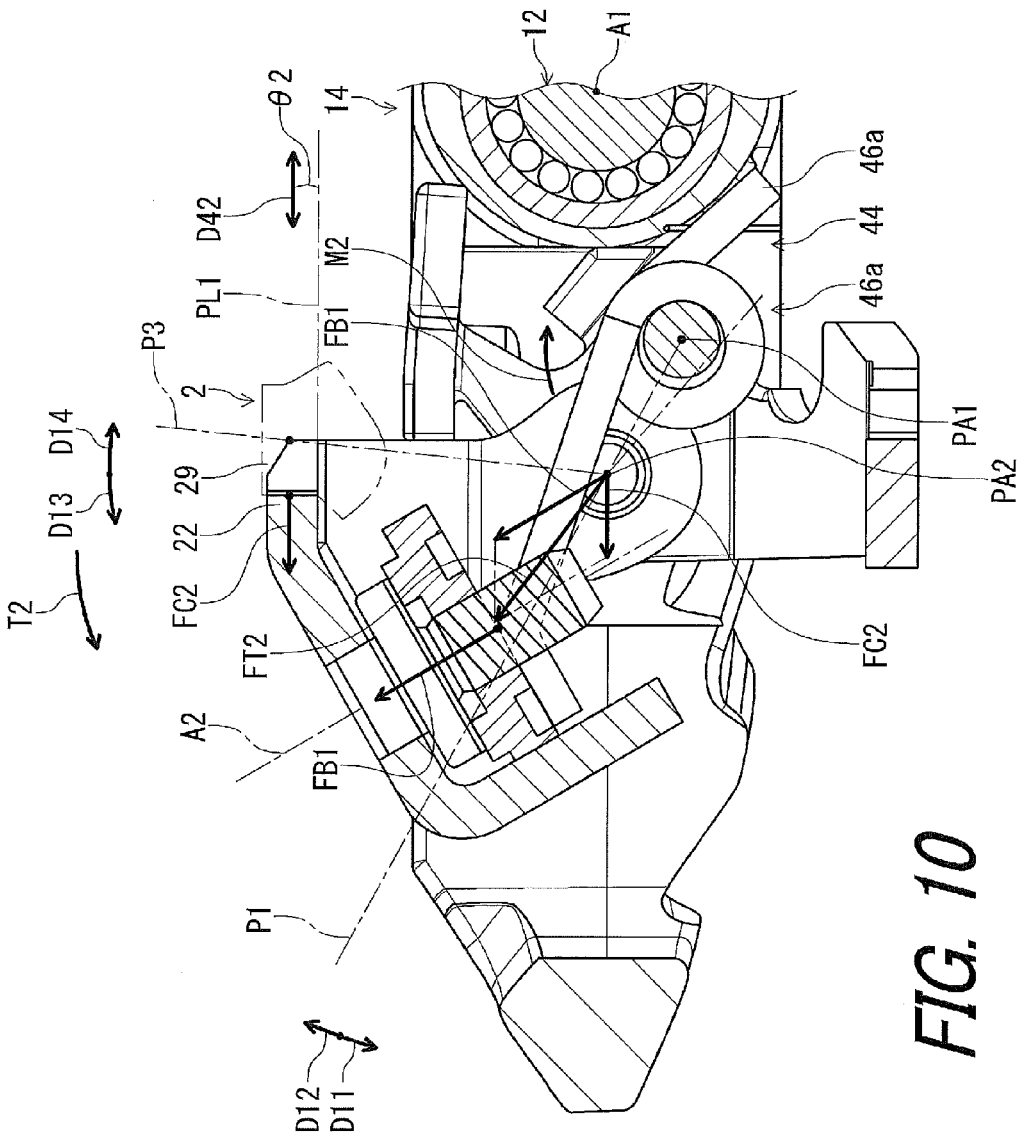

12
A1
θ2
14
46a
D42
44
M2
PL1
46a
FB1
P3
PA1
2
PA2
D14
29
D13
22
T2
FC2
FC2
FT2
A2
FB1
P1
D12
D11

FIG. 10

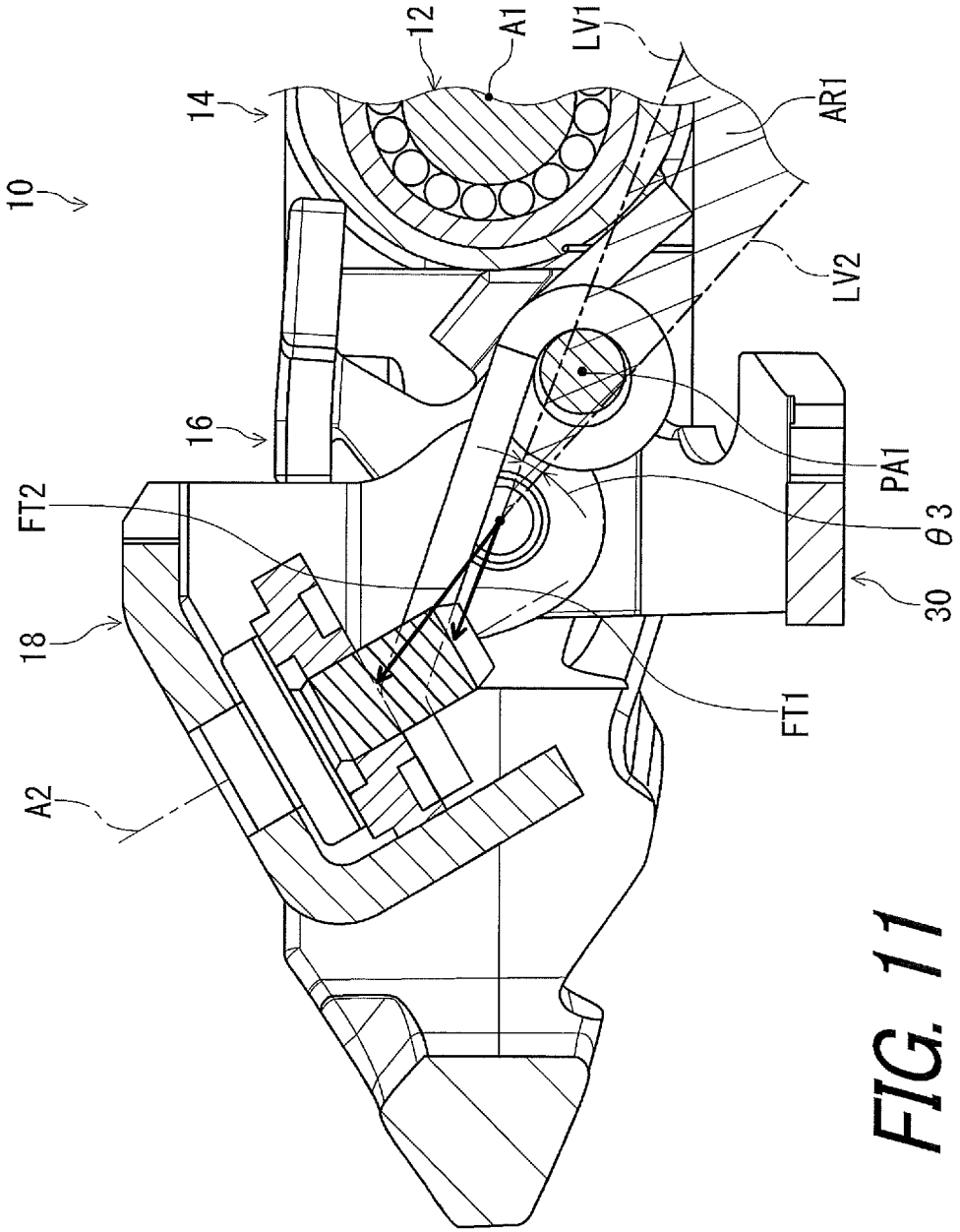


FIG. 11

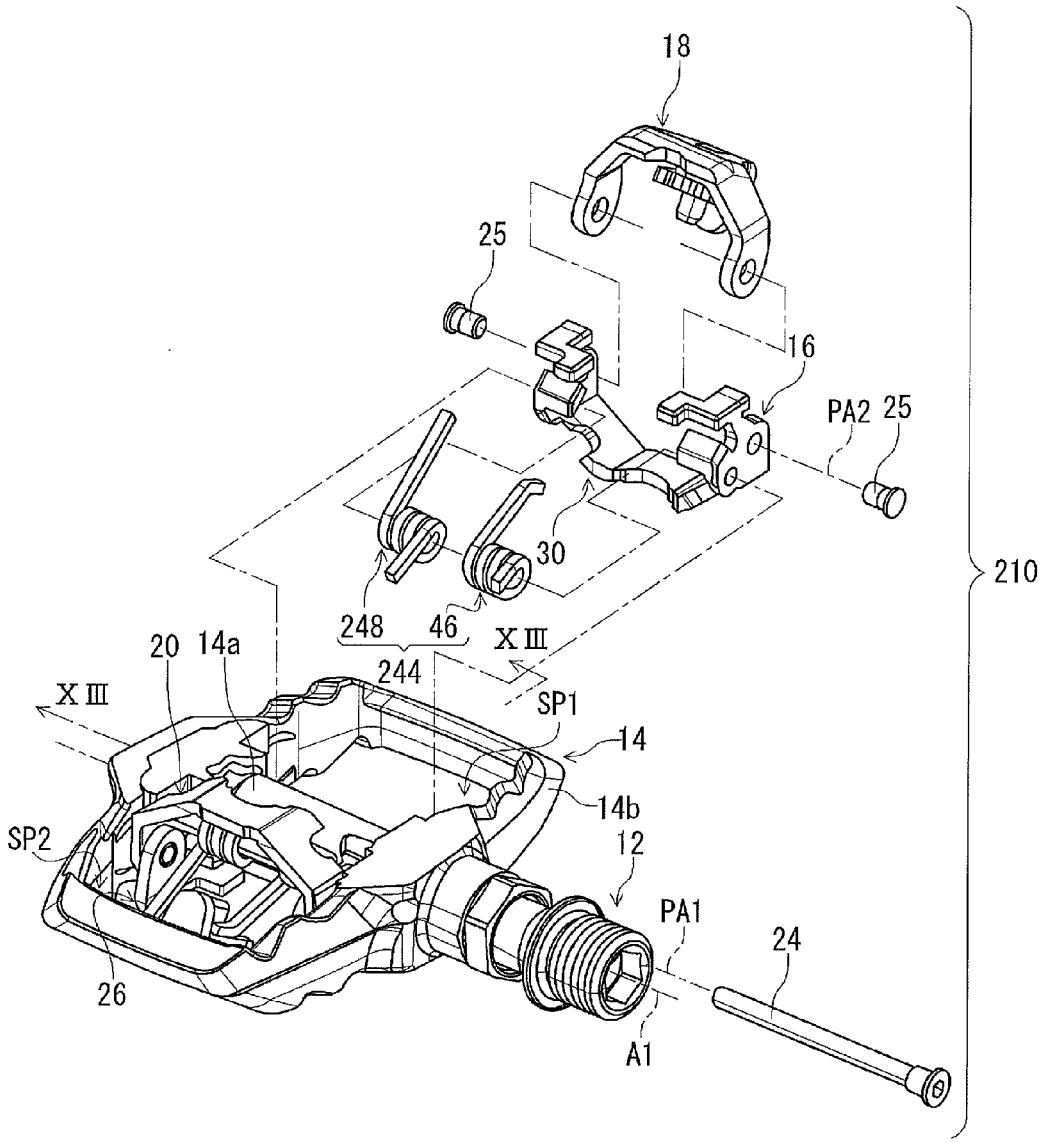

18
25
16
PA2
25
30
210
248
46
XIII
244
20
14a
XIII
SP1
14
14b
12
SP2
PA1
24
26
A1

FIG. 12

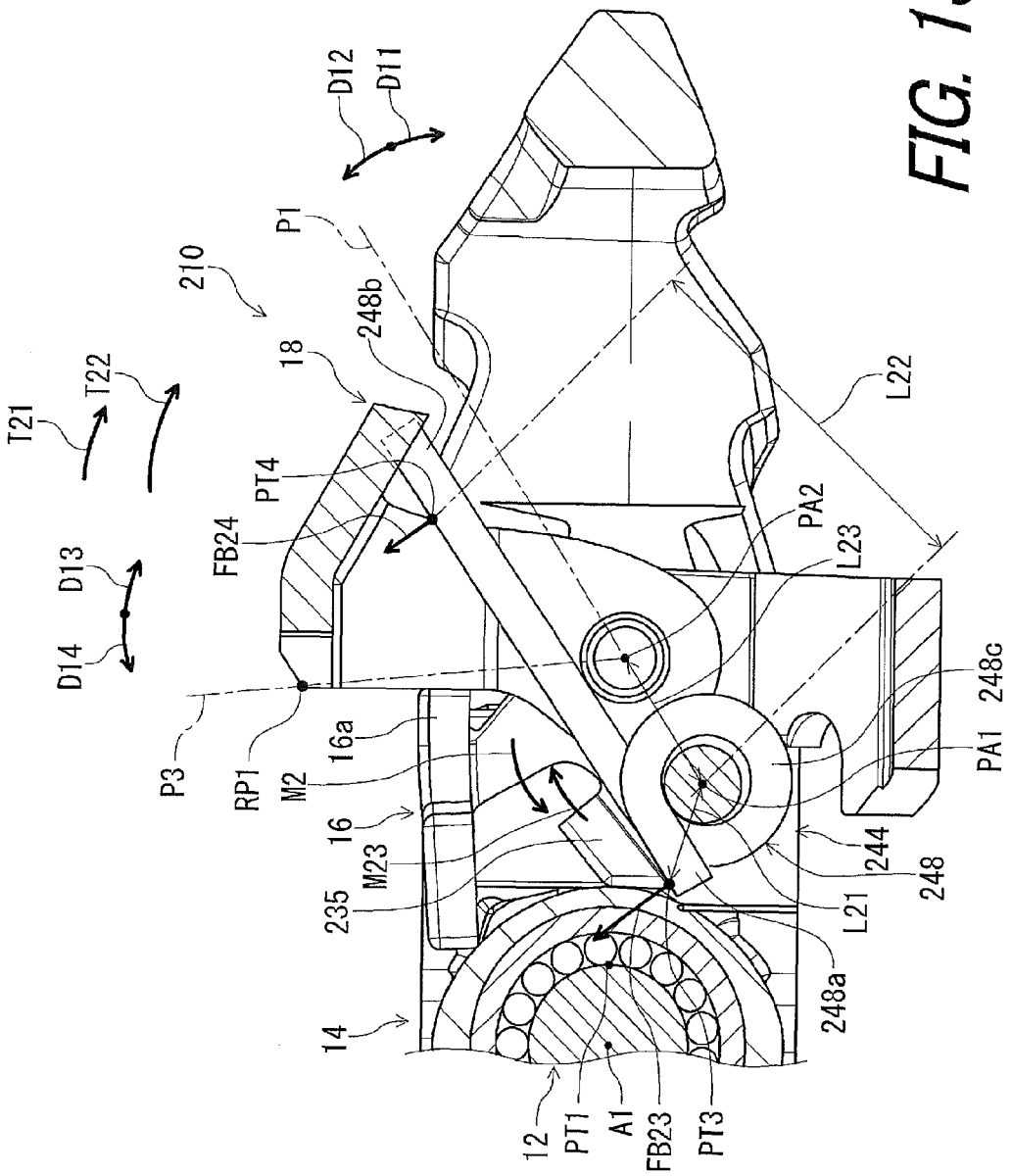
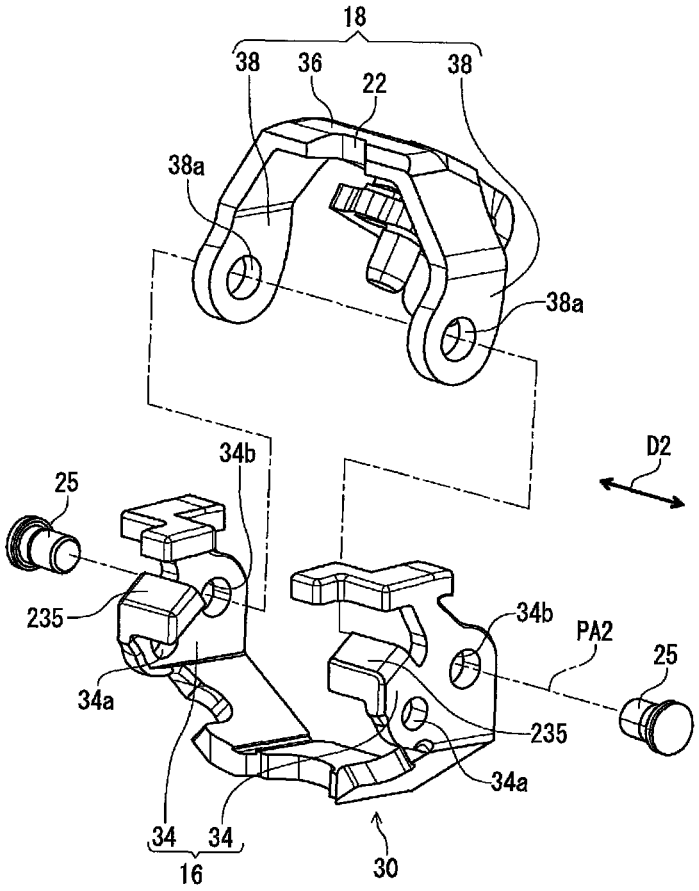

D12
D11
P1
210
248b
18
T21
T22
PT4
FB24
D13
D14
P3
RP1
M2
16a
16
M23
235
14
12
PT1
A1
FB23
PT3
L22
PA2
L23
248c
PA1
244
248
L21
248a

FIG. 13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38
36
22
38
38a
38a
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D2
25
235
34b
PA2
25
34a
235
34a
34
34
16
30

FIG. 14

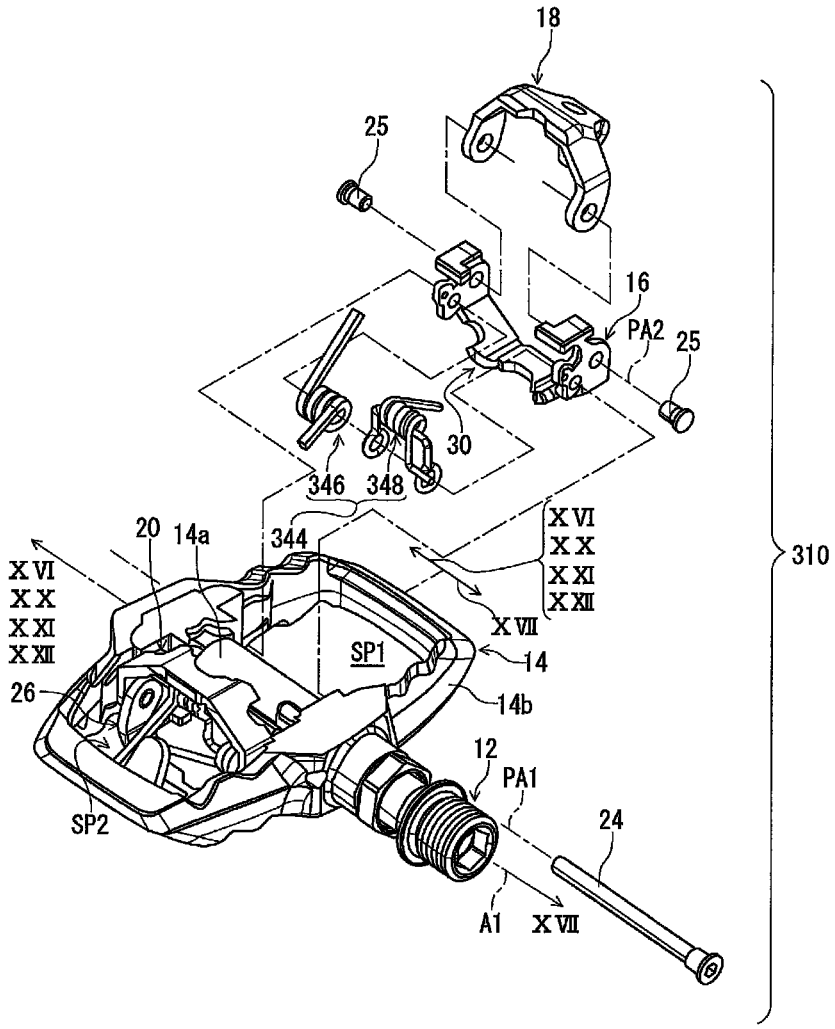

18
25
16
PA2
25
30
346
348
344
20
14a
XVI
XX
XXI
XXII
XVII
SP1
14
14b
26
12
PA1
24
SP2
A1
XVII
310

FIG. 15

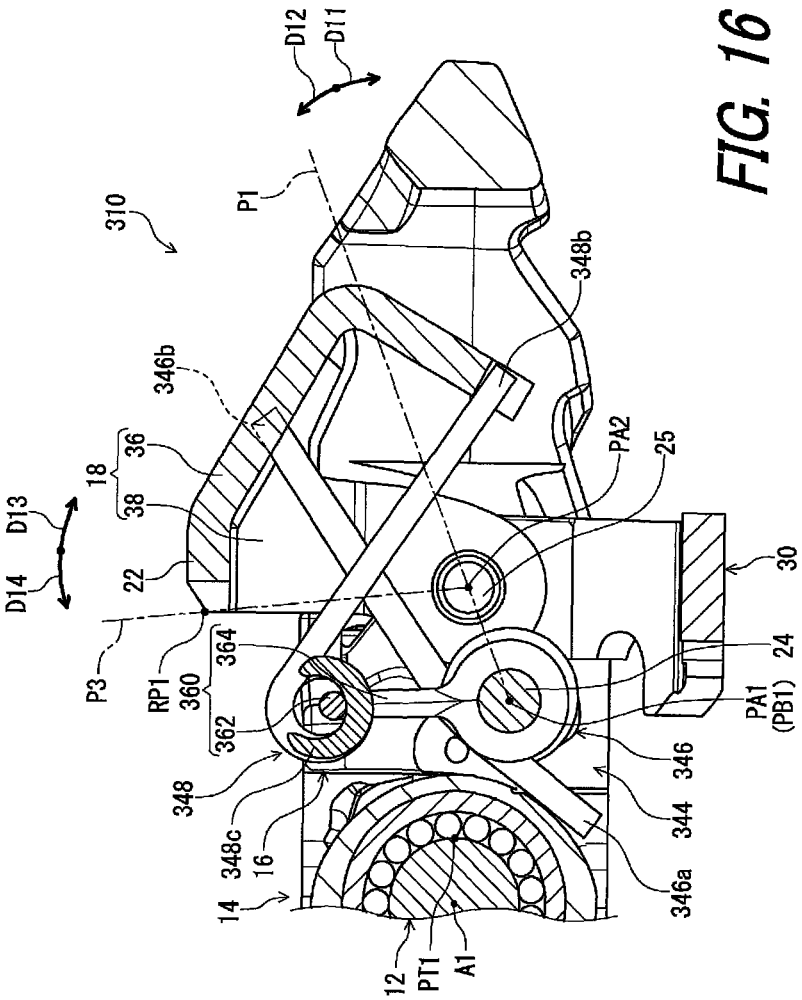

D12
D11
P1
310
348b
346b
18
36
38
22
D13
D14
PA2
25
30
P3
RP1
360
364
362
24
PA1
(PB1)
346
348
348c
16
14
344
346a
12
PT1
A1

FIG. 16

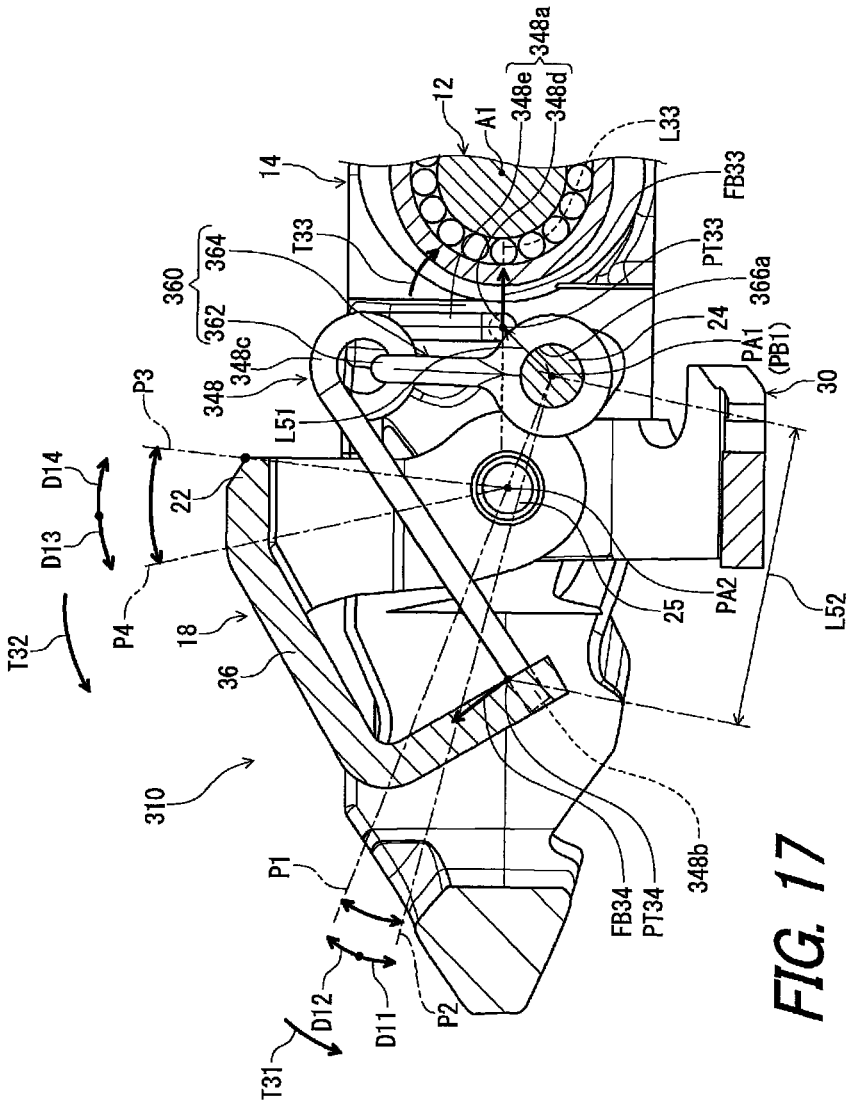

12
A1
348a
348e
348d
L33
14
FB33
T33
PT33
360
364
362
348c
348
366a
24
PA1
(PB1)
30
P3
L51
22
D14
D13
T32
P4
18
36
25
PA2
L52
310
P1
D12
D11
P2
T31
FB34
PT34
348b

FIG. 17

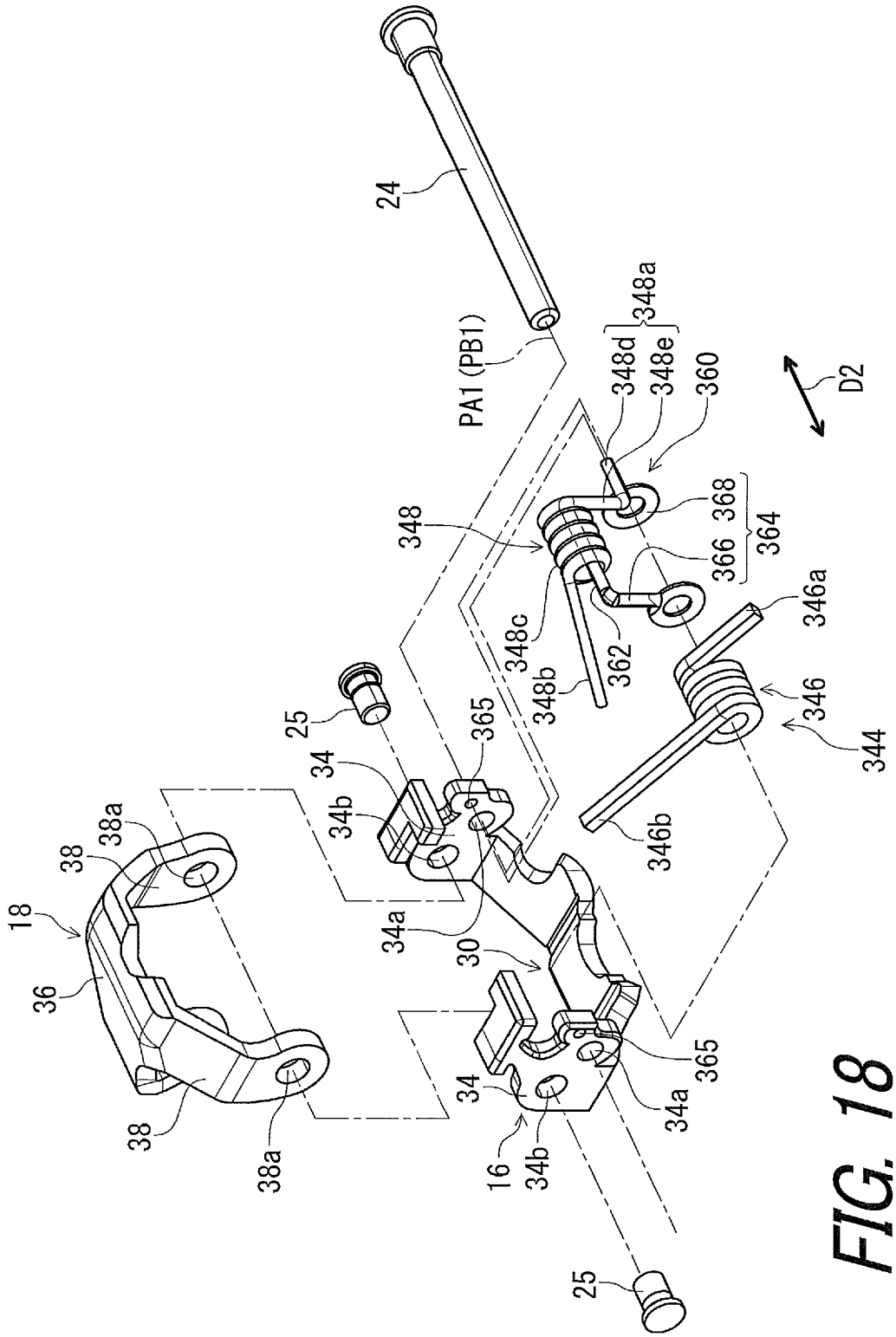

24
PA1 (PB1)
348a
348d
348e
360
D2
348
368
364
366
348c
362
348b
346a
346
344
346b
25
365
34
34b
34a
30
18
38
38a
36
16

FIG. 18

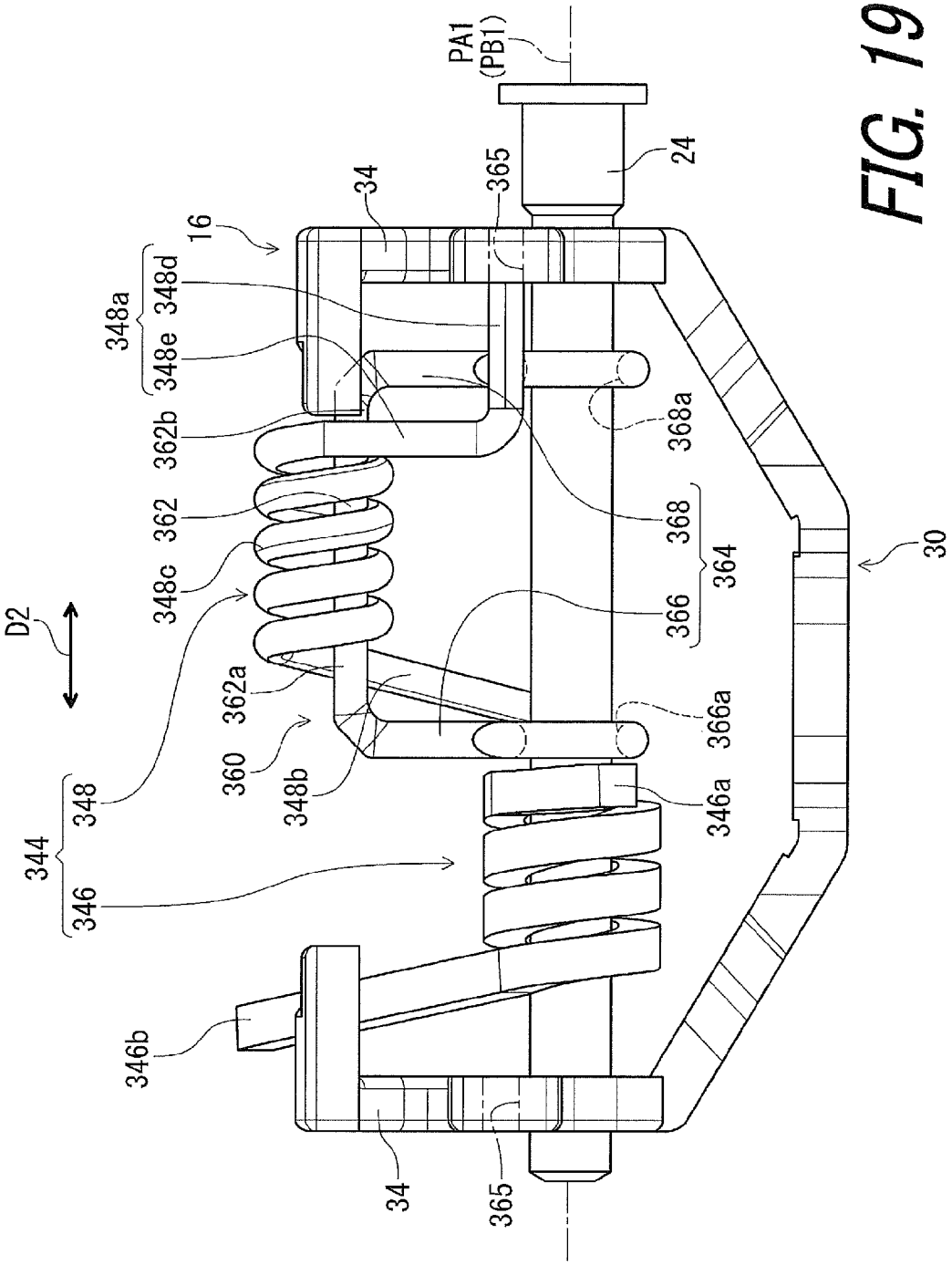

PA1
(PB1)
24
365
34
16
348a
348d
348e
362b
362
348c
D2
348
344
346
360
362a
348b
346b
34
365
368a
368
364
366
366a
346a
30

FIG. 19

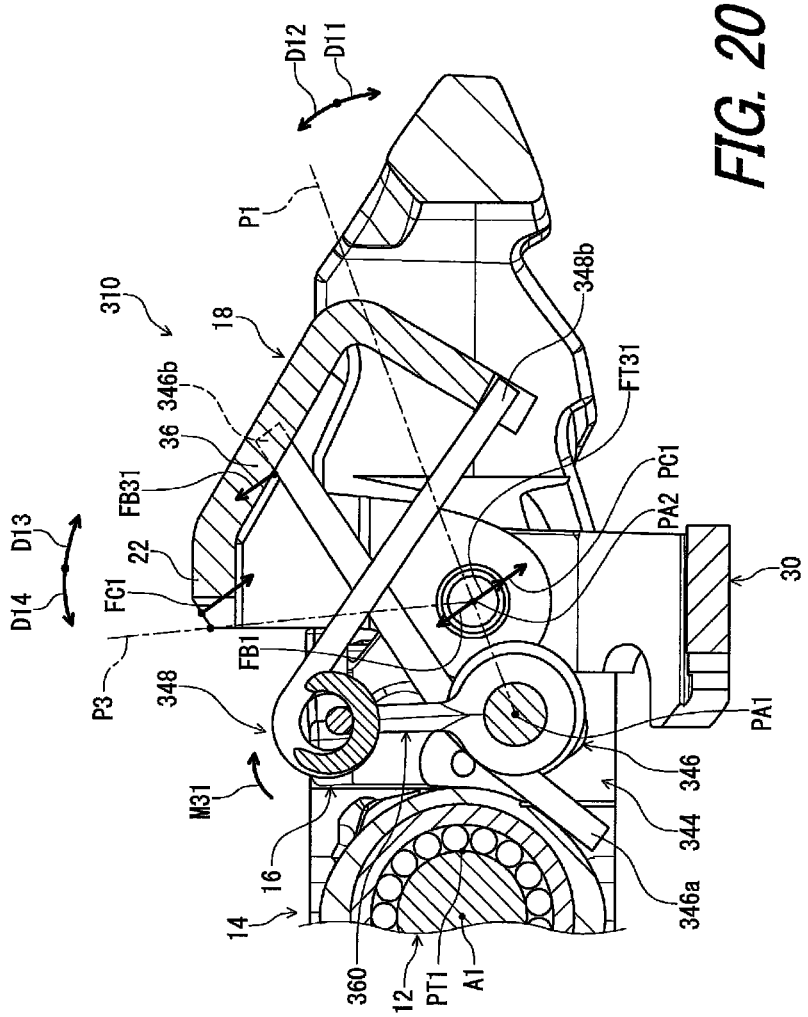

D12
D11
P1
310
18
348b
346b
36
FT31
FB31
PC1
PA2
D13
22
30
D14
FC1
FB1
P3
348
PA1
M31
346
344
16
346a
14
360
12
PT1
A1

FIG. 20

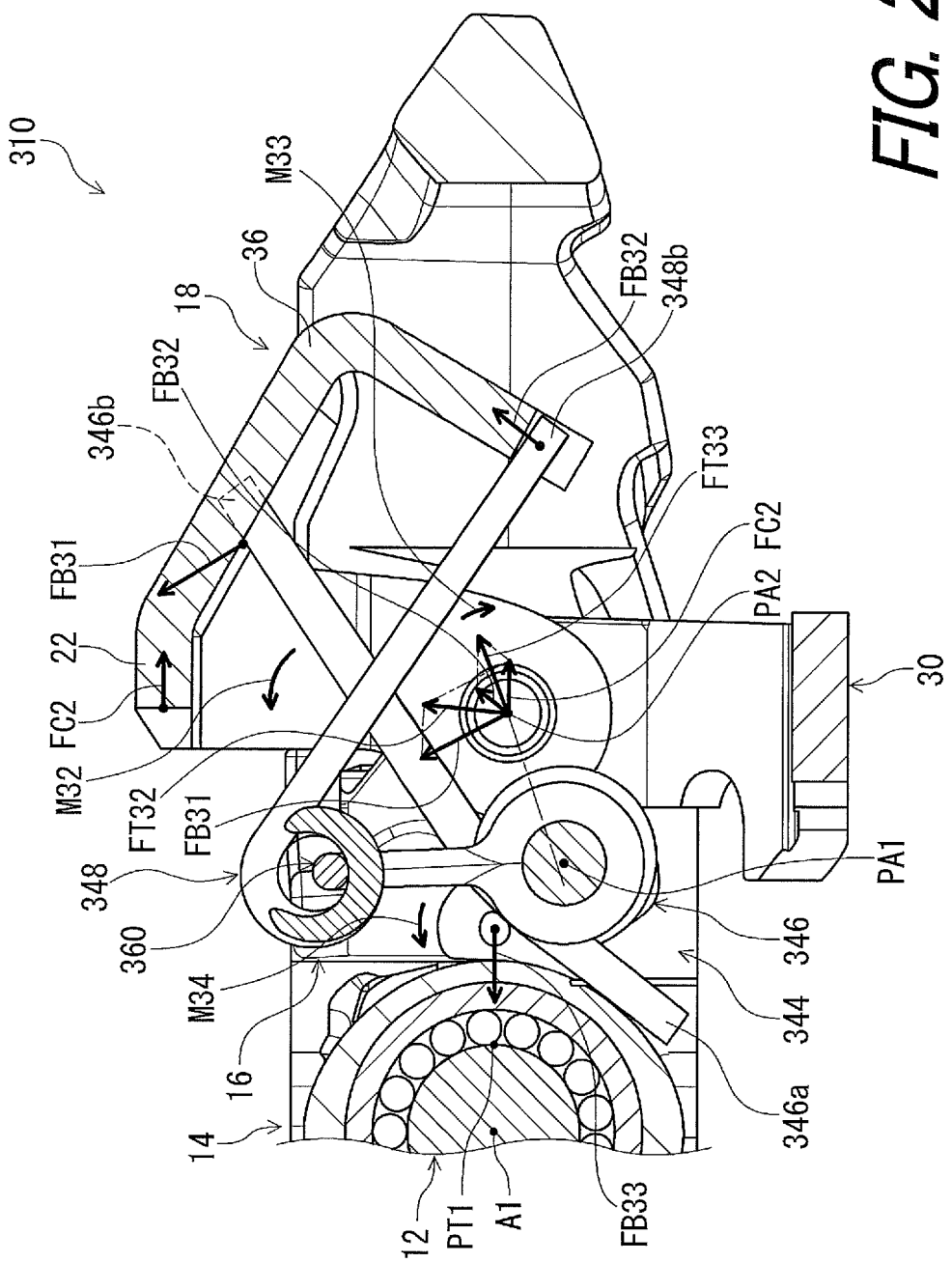
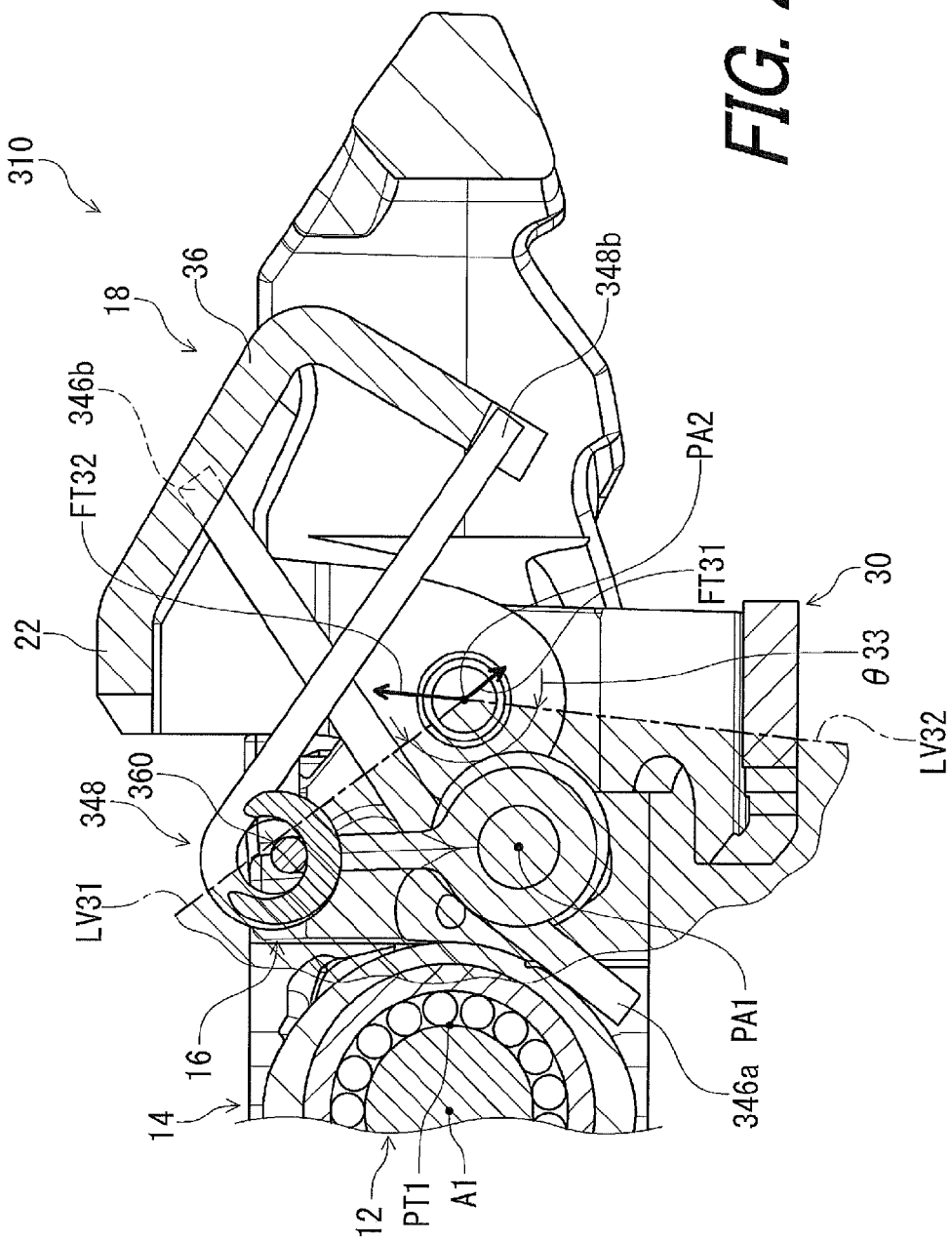

310
M33
36
18
FB32
348b
346b
FB32
FT33
FB31
FC2
PA2
22
FC2
30
M32
FT32
FB31
PA1
348
360
346
M34
344
16
346a
14
12
PT1
A1
FB33

FIG. 21

FIG. 22


310
36
18
348b
346b
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346a
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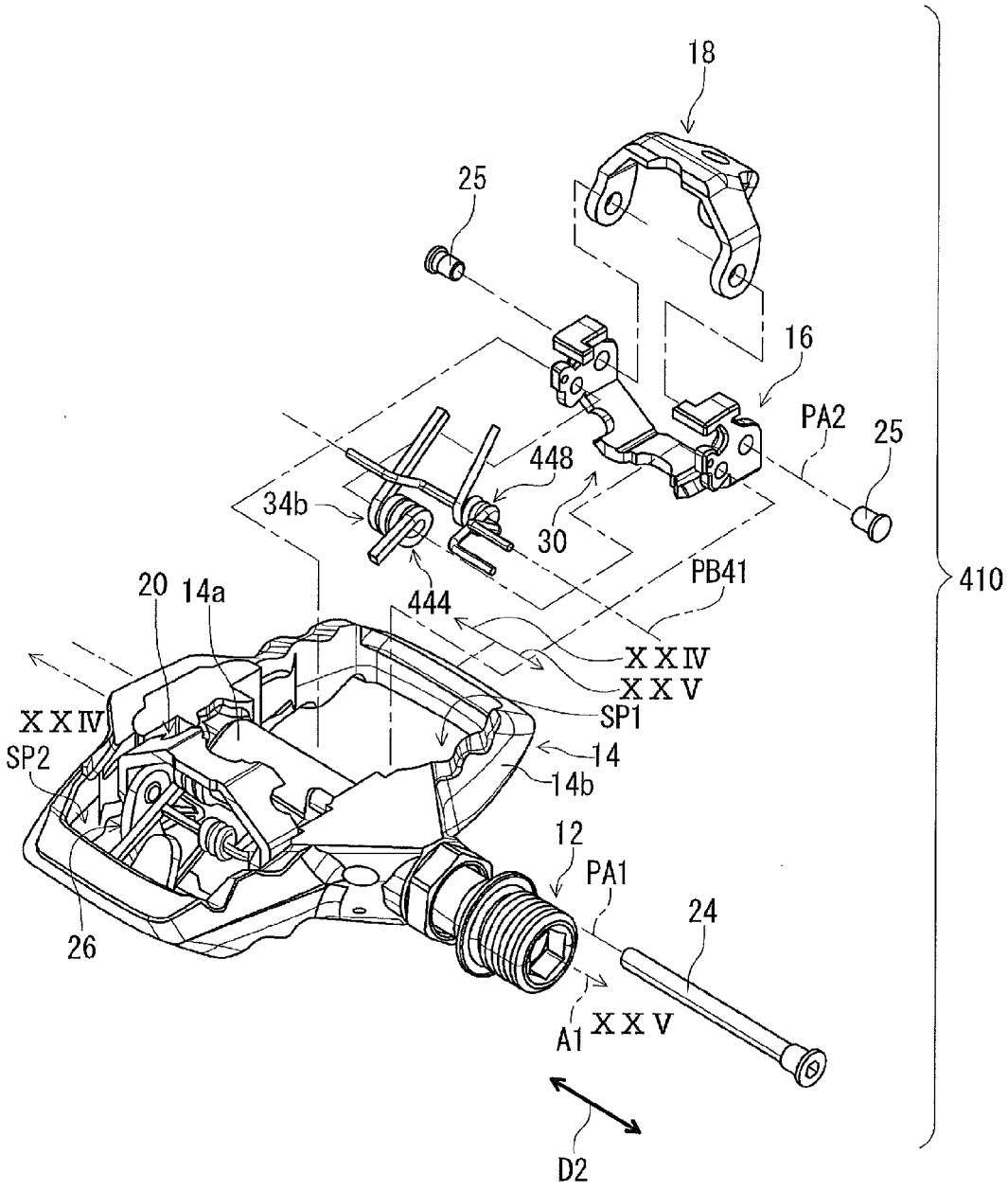
PT1
A1


18
25
16
PA2
25
448
34b
30
444
PB41
410
20
14a
XXIV
XXV
XXIV
SP1
SP2
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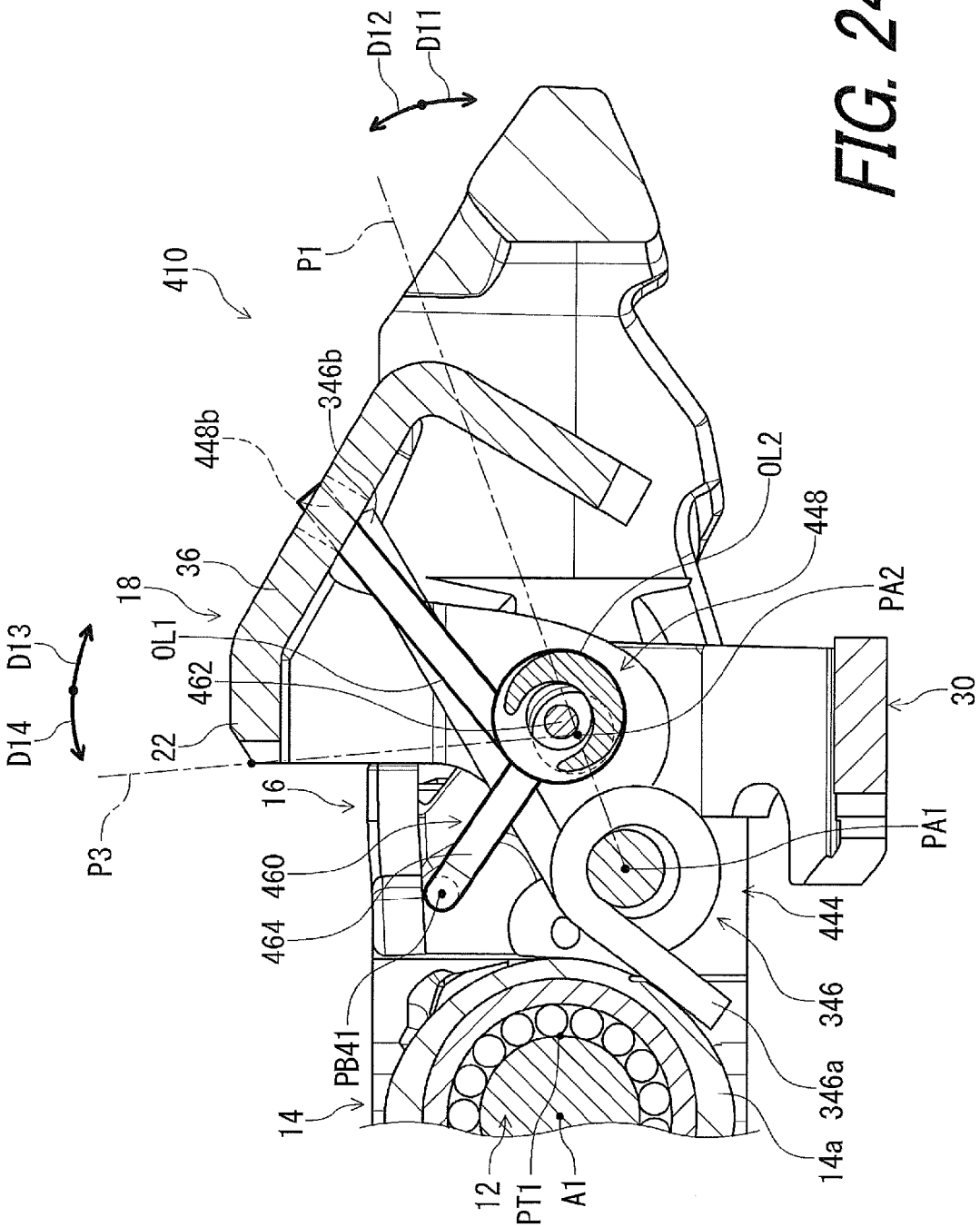
14b
12
PA1
24
26
A1
XXV
D2

FIG. 23


D12
D11
P1
410
346b
448b
0L2
448
36
18
PA2
0L1
462
D13
D14
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30
16
P3
460
PA1
464
444
346
PB41
346a
14
14a
12
PT1
A1

FIG. 24

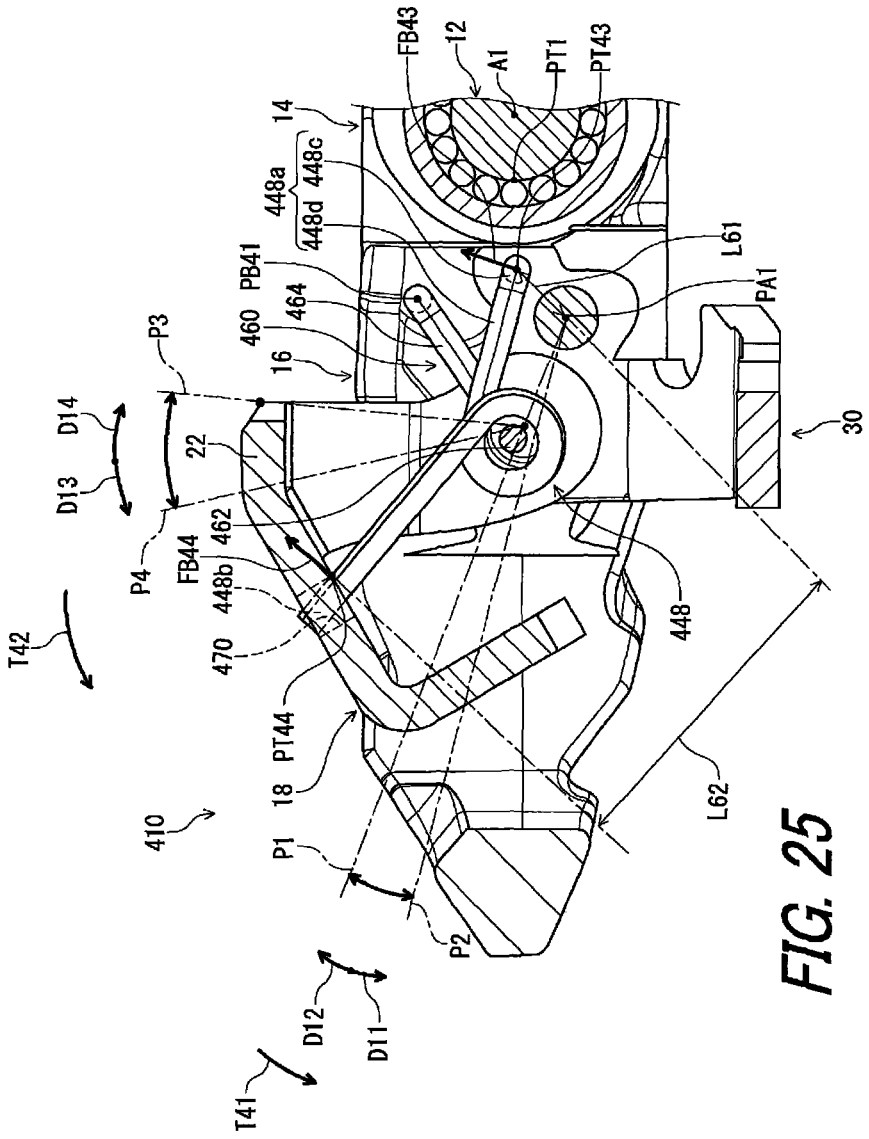
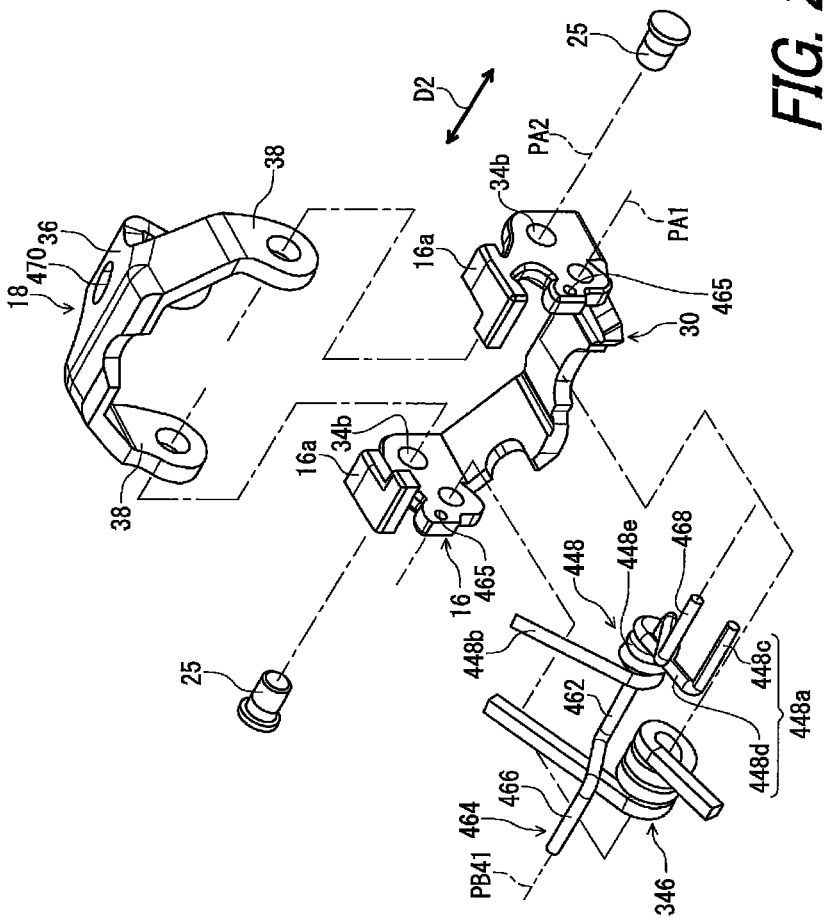

FB43
12
A1
PT1
PT43
14
448a
448c
448d
PB41
460
464
16
L61
PA1
P3
D14
D13
22
30
462
FB44
448b
P4
T42
470
448
PT44
18
410
P1
L62
P2
D12
D11
T41

FIG. 25


25
D2
PA2
34b
PA1
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36
470
18
16a
465
30
38
16a
34b
16
465
448
448e
468
448b
448c
462
448a
448d
466
464
PB41
346
25

FIG. 26

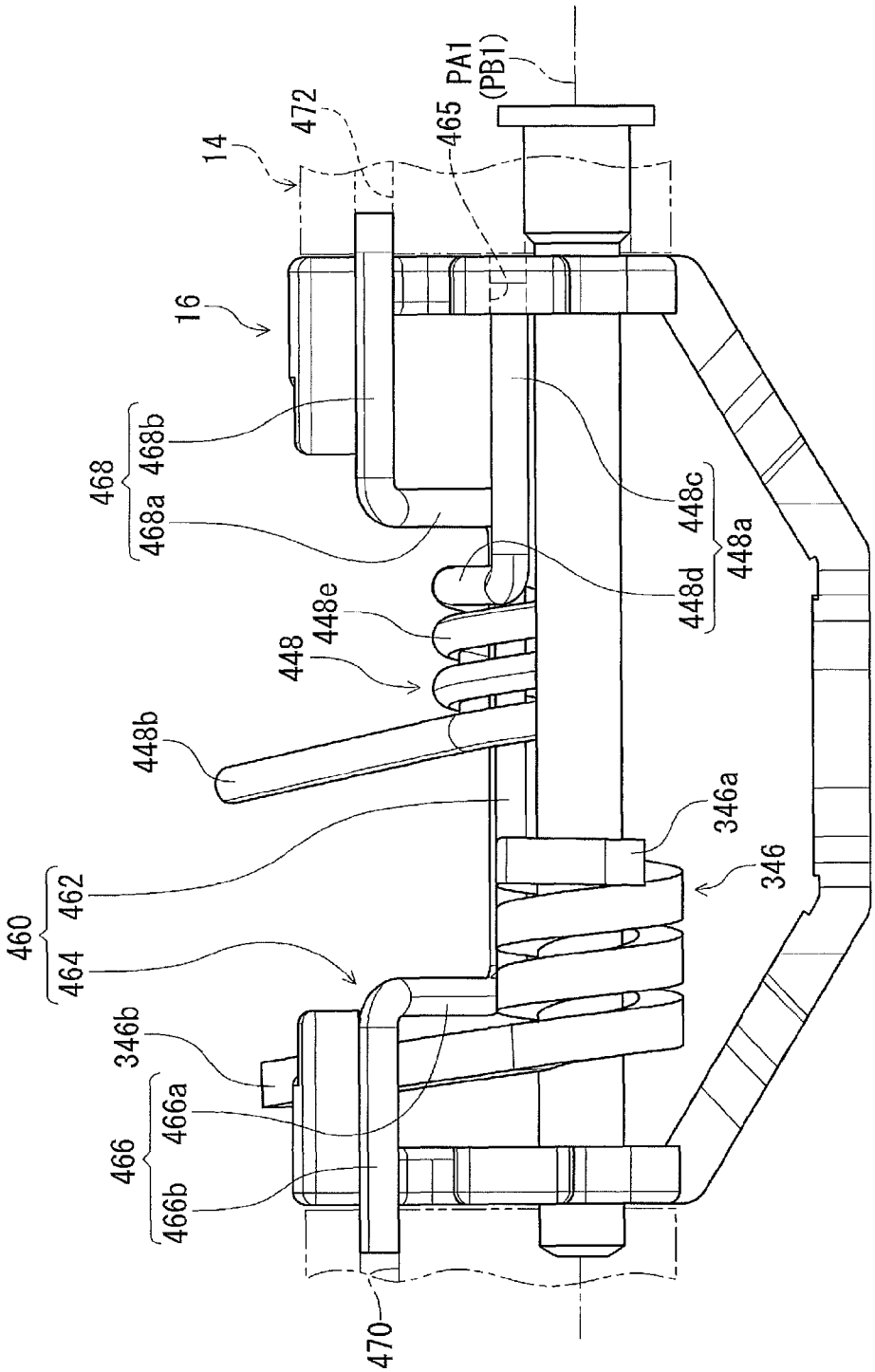
PA1
(PB1)
465
472
14
16
468
468b
468a
448c
448d
448a
448e
448
448b
30
346a
346
460
462
464
346b
466
466a
466b
470

FIG. 27

BICYCLE PEDAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a bicycle pedal.

2. Discussion of the Background

Bicycling is becoming an increasingly more popular form of recreation as well as a means of transportation. Moreover, bicycling has become a very popular competitive sport for both amateurs and professionals. Whether the bicycle is used for recreation, transportation or competition, the bicycle industry is constantly improving the various components of the bicycle. One bicycle component that has been extensively redesigned is a bicycle pedal such as a clipless pedal.

SUMMARY OF THE INVENTION

In accordance with a first aspect of the present invention, a bicycle pedal comprises a pedal axle, a pedal body, a first sub member, a first clamping member, a second clamping member, and a biasing structure. The pedal body is rotatably supported on the pedal axle about a rotational axis. The first sub member is movably coupled to the pedal body. The first sub member is movable relative to the pedal body about a first pivot axis in a first pivot direction and a second pivot direction opposite to the first pivot direction. The first clamping member is movably coupled to the first sub member. The first clamping member is movable relative to the first sub member about a second pivot axis substantially parallel to the first pivot axis in a third pivot direction and a fourth pivot direction opposite to the third pivot direction. The second clamping member is coupled to the pedal body to clamp a cleat together with the first clamping member. The biasing structure is configured to bias the first clamping member in the fourth pivot direction and the first sub member in the second pivot direction. The first pivot axis is closer to a point on the pedal axle than the second pivot axis when viewed from an axial direction parallel to the first pivot axis.

In accordance with a second aspect of the present invention, the bicycle pedal according to the first aspect is configured so that the first pivot axis is substantially parallel to the rotational axis. The first pivot axis is closer to the pedal axle than the second pivot axis when viewed from the axial direction parallel to the first pivot axis.

In accordance with a third aspect of the present invention, the bicycle pedal according to the first aspect is configured so that the first clamping member includes a first cleat engagement portion configured to engage the cleat in a state where the first clamping member and the second clamping member clamp the cleat. The second pivot axis is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

In accordance with a fourth aspect of the present invention, the bicycle pedal according to the first aspect is configured so that the first sub member is movable relative to the pedal body about the first pivot axis between a first position and a second position. The first clamping member is movable relative to the first sub member about a second pivot axis between a third position and a fourth position. The first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure are configured such that a first torque to pivot the first sub member about the first pivot axis toward the second position is less than a second torque to pivot the first clamping member about the second pivot axis toward the fourth position.

In accordance with a fifth aspect of the present invention, the bicycle pedal according to the first aspect is configured so that the first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure are configured such that the first sub member is moved relative to the pedal body about the first pivot axis in the first pivot direction in a state where a first force to move the first clamping member in the first direction is applied to the first clamping member. The first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure are configured such that the first sub member stays or is moved relative to the pedal body about the first pivot axis in the second pivot direction in a state where a second force to move the first clamping member in the third direction is applied to the first clamping member, the first force directing in a direction different from a direction of the second force.

In accordance with a sixth aspect of the present invention, the bicycle pedal according to the fifth aspect is configured so that the first force is applied from the cleat to the first clamping member in a step-in operation of the bicycle pedal. The second force is applied from the cleat to the first clamping member in a step-out operation of the bicycle pedal.

In accordance with a seventh aspect of the present invention, the bicycle pedal according to the sixth aspect is configured so that the first force directs in a first force direction to provide a first force angle between the first force direction and a cleat attachment plane defined by the first clamping member and the second clamping member. The second force directs in a second force direction to provide a second force angle between the second force direction and the cleat attachment plane. The first force angle is larger than the second force angle.

In accordance with an eighth aspect of the present invention, the bicycle pedal according to the third aspect is configured so that the biasing structure includes a first biasing member and a second biasing member. The first biasing member is configured to bias the first clamping member relative to the pedal body in the fourth pivot direction. The second biasing member is configured to bias the first clamping member relative to the first sub member in the fourth pivot direction.

In accordance with a ninth aspect of the present invention, the bicycle pedal according to the eighth aspect is configured so that the first biasing member includes a first end and a second end. The first end is configured to engage with the pedal body. The second end is configured to engage with the first clamping member. The second biasing member includes a third end and a fourth end. The third end is configured to engage with the first sub member. The fourth end is configured to engage with the first clamping member.

In accordance with a tenth aspect of the present invention, the bicycle pedal according to the ninth aspect is configured so that the second biasing member is configured to apply a biasing force to the first sub member at a third point defined between the third end and the first sub member. The second biasing member is configured to apply a biasing force to the first clamping member at a fourth point defined between the fourth end and the first clamping member. A distance between the first pivot axis and the third point is shorter than a distance between the first pivot axis and the fourth point.

In accordance with an eleventh aspect of the present invention, the bicycle pedal according to the eighth aspect is

configured so that the biasing structure includes a biasing support configured to support the second biasing member to be pivotable relative to the first sub member about a biasing pivot axis.

In accordance with a twelfth aspect of the present invention, the bicycle pedal according to the eleventh aspect is configured so that the biasing pivot axis is substantially coaxial with the first pivot axis.

In accordance with a thirteenth aspect of the present invention, the bicycle pedal according to the eleventh aspect is configured so that the biasing support includes a movable part and a pivot part. The movable part is spaced apart from the biasing pivot axis. The pivot part is configured to pivotably support the movable part relative to the pedal body about the biasing pivot axis. The second biasing member is mounted to the movable part.

In accordance with a fourteenth aspect of the present invention, the bicycle pedal according to the thirteenth aspect is configured so that the movable part is provided between the pedal axle and the second pivot axis when viewed from the axial direction parallel to the rotational axis.

In accordance with a fifteenth aspect of the present invention, the bicycle pedal according to the thirteenth aspect is configured so that the movable part is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

In accordance with a sixteenth aspect of the present invention, the bicycle pedal according to the thirteenth aspect is configured so that the third end of the second biasing member includes a contact part configured to contact the first sub member. The contact part is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

In accordance with a seventeenth aspect of the present invention, the bicycle pedal according to the thirteenth aspect is configured so that the pivot part is configured to be pivotably connected to the pedal body.

In accordance with an eighteenth aspect of the present invention, the bicycle pedal according to the thirteenth aspect is configured so that the biasing pivot axis is closer to the first cleat engagement portion than the second pivot axis when viewed from the axial direction parallel to the rotational axis.

In accordance with a nineteenth aspect of the present invention, the bicycle pedal according to the thirteenth aspect is configured so that when viewed from the axial direction parallel to the rotational axis, the second pivot axis is disposed within an outline of the second biasing member in a state where the first clamping member is disposed at a rest position where the first clamping member is free from a force from the cleat.

In accordance with a twentieth aspect of the present invention, the bicycle pedal according to the eighteenth aspect is configured so that the third end of the second biasing member includes a contact part configured to contact the first sub member. The contact part is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

In accordance with a twenty-first aspect of the present invention, the bicycle pedal according to the first aspect is configured so that the pedal body includes a restricting portion configured to restrict the first sub member from moving relative to the pedal body in the second pivot direction.

In accordance with a twenty-second aspect of the present invention, a bicycle pedal comprises a pedal axle, a pedal body, a first sub member, a first clamping member, a second clamping member, and a biasing structure. The pedal body is rotatably supported on the pedal axle about a rotational axis. The first sub member is movably coupled to the pedal body. The first sub member is movable relative to the pedal body about a first pivot axis in a first pivot direction and a second pivot direction opposite to the first pivot direction. The first clamping member is movably coupled to the first sub member. The first clamping member is movable relative to the first sub member about a second pivot axis substantially parallel to the first pivot axis in the third pivot direction and the fourth pivot direction. The second clamping member is coupled to the pedal body to clamp a cleat together with the first clamping member. The biasing structure is configured to bias the first clamping member in the fourth pivot direction and the first sub member in the second pivot direction. The first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure are configured such that the first sub member is moved relative to the pedal body about the first pivot axis in the first pivot direction in a state where a first force to move the first clamping member in the first pivot direction is applied to the first clamping member. The first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure are configured such that the first sub member stays or is moved relative to the pedal body about the first pivot axis in the second pivot direction in a state where a second force to move the first clamping member in the third pivot direction is applied to the first clamping member, the first force directing in a direction different from a direction of the second force.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

FIG. **1** is a perspective view of a bicycle pedal in accordance with a first embodiment, with a cleat;

FIG. **2** is a cross-sectional view of the bicycle pedal taken along line II-II of FIG. **1**;

FIG. **3** is a cross-sectional view of the bicycle pedal taken along line III-III of FIG. **1**;

FIG. **4** is a cross-sectional view of the bicycle pedal taken along line IV-IV of FIG. **1**;

FIG. **5** is an exploded perspective view of the bicycle pedal illustrated in FIG. **1**;

FIG. **6** is a partial exploded perspective view of the bicycle pedal illustrated in FIG. **1**;

FIG. **7** is a partial exploded perspective view of the bicycle pedal taken along line VII-VII of FIG. **1**;

FIG. **8** is a partial enlarged cross-sectional view of the bicycle pedal taken along line VIII-VIII of FIG. **1**;

FIG. **9** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XI-XI of FIG. **1**;

FIG. **10** is a partial enlarged cross-sectional view of the bicycle pedal taken along line X-X of FIG. **1**;

FIG. **11** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XI-XI of FIG. **1**;

FIG. **12** is an exploded perspective view of a bicycle pedal in accordance with a second embodiment;

FIG. **13** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XIII-XIII of FIG. **12**;

FIG. **14** is a partial exploded perspective view of the bicycle pedal illustrated in FIG. **12**;

FIG. **15** is an exploded perspective view of a bicycle pedal in accordance with a third embodiment;

FIG. **16** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XVI-XVI of FIG. **15**;

FIG. **17** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XVII-XVII of FIG. **15**;

FIG. **18** is a partial exploded perspective view of the bicycle pedal illustrated in FIG. **15**;

FIG. **19** is a partial side elevational view of a biasing structure of the bicycle pedal illustrated in FIG. **15**;

FIG. **20** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XX-XX of FIG. **15**;

FIG. **21** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XXI-XXI of FIG. **15**;

FIG. **22** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XXII-XXII of FIG. **15**;

FIG. **23** is an exploded perspective view of a bicycle pedal in accordance with a fourth embodiment;

FIG. **24** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XXIV-XXIV of FIG. **23**;

FIG. **25** is a partial enlarged cross-sectional view of the bicycle pedal taken along line XXV-XXV of FIG. **23**;

FIG. **26** is a partial exploded perspective view of the bicycle pedal illustrated in FIG. **23**; and

FIG. **27** is a partial side elevational view of a biasing structure of the bicycle pedal illustrated in FIG. **23**.

DESCRIPTION OF THE EMBODIMENTS

The embodiments will now be described with reference to the accompanying drawings, wherein like reference numerals designate corresponding or identical elements throughout the various drawings.

First Embodiment

Referring initially to FIG. **1**, a bicycle pedal **10** in accordance with the first embodiment comprises a pedal axle **12**, a pedal body **14**, a first sub member **16**, a first clamping member **18**, and a second clamping member **20**. The pedal axle **12** is configured to be secured to a crank arm (not shown). The pedal body **14** is rotatably supported on the pedal axle **12** about a rotational axis A**1**.

The first sub member **16** is movably coupled to the pedal body **14**. The first clamping member **18** is movably coupled to the first sub member **16**. In the illustrated embodiment, the first sub member **16** is pivotably coupled to the pedal body **14**. The first clamping member **18** is pivotably coupled to the first sub member **16**. The second clamping member **20** is coupled to the pedal body **14** to clamp a cleat **2** together with the first clamping member **18**. The cleat **2** is attached to a sole of a shoe (not shown) using bolts **4**. The cleat **2** includes a cleat body **6** and an attachment plate **8**.

In the illustrated embodiment, the first clamping member **18** is a rear clamping member configured to engage with a rear end **2***a* of the cleat **2**. The second clamping member **20** is a front clamping member configured to engage with a front end **2***b* of the cleat **2**. However, the first clamping member **18** can be a front clamping member, and the second clamping member **20** can be a rear clamping member if needed and/or desired.

In the present application, the following directional terms "front", "rear", "forward", "rearward", "left", "right", "transverse", "upward" and "downward" as well as any other similar directional terms refer to those directions which are determined on the basis of a user (e.g., a rider) who sits on a saddle (not shown) of a bicycle (not shown) with facing a handlebar (not shown). Accordingly, these terms, as utilized to describe the bicycle pedal **10**, should be interpreted relative to the bicycle equipped with the bicycle pedal **10** as used in an upright riding position on a horizontal surface.

As seen in FIG. **2**, the first sub member **16** is movable relative to the pedal body **14** about a first pivot axis PA**1** in a first pivot direction D**11** and a second pivot direction D**12** opposite to the first pivot direction D**11**. The first sub member **16** is movable relative to the pedal body **14** about the first pivot axis PA**1** between a first position P**1** and a second position P**2**. In the illustrated embodiment, the first sub member **16** is pivotable relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11** and the second pivot direction D**12**. The first sub member **16** is pivotable relative to the pedal body **14** about the first pivot axis PA**1** between the first position P**1** and the second position P**2**. The first sub member **16** is positioned at the first position P**1** in a state where the cleat **2** (FIG. **1**) is released from the bicycle pedal **10**.

As seen in FIG. **3**, the pedal body **14** includes a restricting portion **21** configured to restrict the first sub member **16** from moving relative to the pedal body **14** in the second pivot direction D**12**. The restricting portion **21** is configured to restrict the first sub member **16** from pivoting relative to the pedal body **14** about the first pivot axis PA**1** in the second pivot direction D**12**. The first sub member **16** is configured to be in contact with the restricting portion **21** to restrict the first sub member **16** from pivoting relative to the pedal body **14** about the first pivot axis PA**1** in the second pivot direction D**12**. The first sub member **16** is positioned at the first position P**1** in a state where the restricting portion **21** restricts the first sub member **16** from moving relative to the pedal body **14** in the second pivot direction D**12**. However, the first position P**1** can be a location where the first sub member **16** is spaced apart from the restricting portion **21**.

As seen in FIG. **4**, the first clamping member **18** is movable relative to the first sub member **16** about a second pivot axis PA**2** substantially parallel to the first pivot axis PA**1** in a third pivot direction D**13** and a fourth pivot direction D**14** opposite to the third pivot direction D**13**. The first clamping member **18** is movable relative to the first sub member **16** about the second pivot axis PA**2** between a third position P**3** and a fourth position P**4**. In the illustrated embodiment, the first clamping member **18** is pivotable relative to the first sub member **16** about the second pivot axis PA**2** in the third pivot direction D**13** and the fourth pivot direction D**14**. The first clamping member **18** is pivotable relative to the first sub member **16** about the second pivot axis PA**2** between the third position P**3** and the fourth position P**4**.

As seen in FIG. **4**, the first clamping member **18** is positioned at the third position P**3** in a state where the cleat **2** (FIG. **1**) is released from the bicycle pedal **10**. The first sub member **16** includes a restriction part **16***a* configured to restrict the first clamping member **18** from moving relative to the first sub member **16** in the fourth pivot direction D**14**. The restriction part **16***a* is configured to be in contact with the first clamping member **18**. The first clamping member **18** is positioned at the third position P**3** relative to the first sub member **16** in a state where the first sub member **16** restricts

the first clamping member **18** from moving relative to the first sub member **16** in the fourth pivot direction D**14**.

In the illustrated embodiment, as seen in FIG. **4**, the third position P**3** and the fourth position P**4** of the first clamping member **18** are defined based on the second pivot axis PA**2** and a reference point RP**1**. The first position P**1** and the second position P**2** of the first sub member **16** are defined based on the first pivot axis PA**1** and the second pivot axis PA**2**.

As seen in FIG. **2**, the first clamping member **18** is pivotable together with the first sub member **16** relative to the pedal body **14** about the first pivot axis PA**1**. In the illustrated embodiment, the first clamping member **18** is pivotable together with the first sub member **16** relative to the pedal body **14** about the first pivot axis PA**1** between a fifth position P**5** and a sixth position P**6**. The first clamping member **18** pivots relative to the pedal body **14** about the first pivot axis PA**1** between the fifth position P**5** and the sixth position P**6** in a state where the first clamping member **18** is positioned at the third position P**3** relative to the first sub member **16** (FIG. **4**). The fifth position P**5** of the first clamping member **18** corresponds to the first position P**1** of the first sub member **16**. The sixth position P**6** of the first clamping member **18** corresponds to the second position P**2** of the first sub member **16**.

In the illustrated embodiment, as seen in FIG. **2**, the fifth position P**5** and the sixth position P**6** of the first clamping member **18** are defined based on the first pivot axis PA**1** and a reference point RP**1**.

As seen in FIG. **2**, the first pivot axis PA**1** is substantially parallel to the rotational axis A**1**. The second pivot axis PA**2** is substantially parallel to the rotational axis A**1** and the first pivot axis PA**1**. More specifically, the first pivot axis PA**1** is parallel to the rotational axis A**1**. The second pivot axis PA**2** is parallel to the rotational axis A**1** and the first pivot axis PA**1**.

The first pivot axis PA**1** is closer to a point PT**1** on the pedal axle **12** than the second pivot axis PA**2** when viewed from an axial direction D**2** (a direction perpendicular to a paper surface of FIG. **4**) parallel to the first pivot axis PA**1**. More specifically, the first pivot axis PA**1** is closer to the pedal axle **12** than the second pivot axis PA**2** when viewed from the axial direction D**2** (the direction perpendicular to the paper surface of FIG. **4**) parallel to the first pivot axis PA**1**.

While the first pivot axis PA**1** and the second pivot axis PA**2** are substantially parallel to the rotational axis A**1** in the illustrated embodiment, the first pivot axis PA**1** and the second pivot axis PA**2** do not need to be parallel to the rotational axis A**1**.

As seen in FIG. **2**, the pedal body **14** includes a tubular part **14***a*. The pedal axle **12** includes an axle rod **12***a*, an outer tube **12***b*, and a bearing **12***c*. The outer tube **12***b* is provided in the tubular part **14***a* and is secured to an inner peripheral surface of the tubular part **14***a*. The axle rod **12***a* is configured to be provided in the outer tube **12***b* and is rotatably supported by the outer tube **12***b* via the bearing **12***c*. For example, the point PT**1** is defined on an outer peripheral surface of the axle rod **12***a*. The first pivot axis PA**1** is closer to the rotational axis A**1** than the second pivot axis PA**2** when viewed from the axial direction D**2** (the direction perpendicular to the paper surface of FIG. **4**).

While the point PT**1** is defined on the outer peripheral surface of the axle rod **12***a*, the point PT**1** can be defined at a position other than the position shown in FIG. **4** on the outer peripheral surface of the axle rod **12***a*. Furthermore, the point PT**1** can be defined at a position other than the outer peripheral surface of the axle rod **12***a* in the pedal axle **12**. For example, the point PT**1** can be defined on an outer peripheral surface of the outer tube **12***b*.

As seen in FIG. **2**, the first clamping member **18** includes a first cleat engagement portion **22** configured to engage the cleat **2** (FIG. **1**) in a state where the first clamping member **18** and the second clamping member **20** clamp the cleat **2**. The second pivot axis PA**2** is closer to the first cleat engagement portion **22** than the first pivot axis PA**1** when viewed from the axial direction D**2** parallel to the rotational axis A**1**. Further, the second pivot axis PA**2** is closer to the first cleat engagement portion **22** than the first pivot axis PA**1** in a direction perpendicular to a cleat attachment plane PL**1** (described later). The first cleat engagement portion **22** is configured to be in contact with the rear end **2***a* of the cleat **2** (FIG. **1**).

The second clamping member **20** includes a second cleat engagement portion **23** configured to engage the cleat **2** (FIG. **1**) in a state where the first clamping member **18** and the second clamping member **20** clamp the cleat **2**. The second cleat engagement portion **23** is configured to be in contact with the front end **2***b* of the cleat **2** (FIG. **1**). A cleat attachment plane PL**1** is defined by the first clamping member **18** and the second clamping member **20**. More specifically, the cleat attachment plane PL**1** is defined by the first cleat engagement portion **22** and the second cleat engagement portion **23** in a state where the cleat **2** is removed from the bicycle pedal **10**.

As seen in FIG. **5**, the bicycle pedal **10** further comprises a first pivot shaft **24**. The first pivot shaft **24** is configured to pivotably support the first sub member **16** about the first pivot axis PA**1**. The first pivot shaft **24** is attached to the pedal body **14**. The first sub member **16** is pivotably coupled to the pedal body **14** about the first pivot axis PA**1** by the first pivot shaft **24**. As seen in FIG. **2**, the first pivot axis PA**1** is defined as a center axis of the first pivot shaft **24**.

As seen in FIG. **5**, the bicycle pedal **10** further comprises second pivot shafts **25**. The second pivot shafts **25** are configured to pivotably support the first clamping member **18** about the second pivot axis PA**2**. The second pivot shafts **25** are attached to the first sub member **16**. The first clamping member **18** is pivotably coupled to the first sub member **16** about the second pivot axis PA**2** by the second pivot shafts **25**. As seen in FIG. **2**, the second pivot axis PA**2** is defined as center axes of the second pivot shafts **25**.

In the illustrated embodiment, as seen in FIG. **2**, the bicycle pedal **10** is a two-sided pedal (e.g., mounting bicycle style). More specifically, the bicycle pedal **10** further comprises a second sub member **26**, a third clamping member **28**, and a fourth clamping member **30**. The third clamping member **28** is a rear clamping member configured to engage with the rear end **2***a* of the cleat **2** (FIG. **1**) as well as the first clamping member **18**. The fourth clamping member **30** is a front clamping member configured to engage with the front end **2***b* of the cleat **2** (FIG. **1**) as well as the second clamping member **20**. However, the third clamping member **28** can be a front clamping member, and the fourth clamping member **30** can be a rear clamping member if needed and/or desired.

In the illustrated embodiment, the second sub member **26** has the same structure as the structure of the first sub member **16**. The third clamping member **28** has the same structure as the structure of the first clamping member **18**. The fourth clamping member **30** has the same structure as the structure of the second clamping member **20**. The second sub member **26** can, however, have a different structure from the structure of the first sub member **16**. The third clamping member **28** can have a different structure from the structure

of the first clamping member **18**. The fourth clamping member **30** can have a different structure from the structure of the second clamping member **20**.

The second sub member **26**, the third clamping member **28**, and the fourth clamping member **30** have the same structures as the structures of the first sub member **16**, the first clamping member **18**, and the second clamping member **20**, respectively. Accordingly, elements having substantially the same function as those in the first embodiment will be numbered the same here, and will not be described and/or illustrated in detail here for the sake of brevity.

In a case where the bicycle pedal **10** is a one-sided pedal (e.g., road style), at least one of the second sub member **26**, the third clamping member **28**, and the fourth clamping member **30** can be omitted from the bicycle pedal **10**.

As seen in FIG. **2**, the second sub member **26** is movably coupled to the pedal body **14**. In the illustrated embodiment, the third clamping member **28** is pivotably coupled to the second sub member **26**. The third clamping member **28** is provided on an opposite side of the first clamping member **18** relative to the pedal body **14** (the rotational axis A**1**). The fourth clamping member **30** is coupled to the pedal body **14** to clamp the cleat **2** (FIG. **1**) together with the third clamping member **28**. More specifically, the fourth clamping member **30** is pivotably coupled to the pedal body **14**. The fourth clamping member **30** is provided on an opposite side of the second clamping member **20** relative to the pedal body **14** (the rotational axis A**1**).

As seen in FIG. **2**, the second sub member **26** is movable relative to the pedal body **14** about a third pivot axis PA**3** in a fifth pivot direction D**15** and a sixth pivot direction D**16** opposite to the fifth pivot direction D**15**. The second sub member **26** is movable relative to the pedal body **14** about the third pivot axis PA**3** between a seventh position P**7** and an eighth position P**8**. In the illustrated embodiment, the second sub member **26** is pivotable relative to the pedal body **14** about a third pivot axis PA**3** in a fifth pivot direction D**15** and a sixth pivot direction D**16** opposite to the fifth pivot direction D**15**. The second sub member **26** is pivotable relative to the pedal body **14** about the third pivot axis PA**3** between a seventh position P**7** and an eighth position P**8**. The second sub member **26** is positioned at the seventh position P**7** in a state where the cleat **2** (FIG. **1**) is released from the bicycle pedal **10**.

As seen in FIG. **3**, the pedal body **14** includes an additional restricting portion **31** configured to restrict the second sub member **26** from moving relative to the pedal body **14** in the sixth pivot direction D**16**. The additional restricting portion **31** is configured to restrict the second sub member **26** from pivoting relative to the pedal body **14** about the third pivot axis PA**3** in the sixth pivot direction D**16**. The second sub member **26** is configured to be in contact with the additional restricting portion **31**. The second sub member **26** is positioned at the seventh position P**7** in a state where the additional restricting portion **31** restricts the second sub member **26** from moving relative to the pedal body **14** in the sixth pivot direction D**16**.

As seen in FIG. **4**, the third clamping member **28** is movable relative to the second sub member **26** about a fourth pivot axis PA**4** substantially parallel to the third pivot axis PA**3** in a seventh pivot direction D**17** and an eighth pivot direction D**18** opposite to the seventh pivot direction D**17**. The third clamping member **28** is movable relative to the second sub member **26** about the fourth pivot axis PA**4** between a ninth position P**9** and a tenth position P**10**. In the illustrated embodiment, the third clamping member **28** is pivotable relative to the second sub member **26** about the fourth pivot axis PA**4** in the seventh pivot direction D**17** and the eighth pivot direction D**18**. The third clamping member **28** is pivotable relative to the second sub member **26** about the fourth pivot axis PA**4** between the ninth position P**9** and the tenth position P**10**.

In the illustrated embodiment, as seen in FIG. **4**, the ninth position P**9** and the tenth position P**10** of the third clamping member **28** are defined based on the fourth pivot axis PA**4** and a reference point RP**2**. The seventh position P**7** and the eighth position P**8** of the second sub member **26** are defined based on the third pivot axis PA**3** and the fourth pivot axis PA**4**.

The third pivot axis PA**3** is substantially parallel to the rotational axis A**1**, the first pivot axis PA**1**, and the second pivot axis PA**2**. The fourth pivot axis PA**4** is substantially parallel to the rotational axis A**1**, the first pivot axis PA**1**, the second pivot axis PA**2**, and the third pivot axis PA**3**. The third pivot axis PA**3** is closer to the point PT**1** on the pedal axle **12** than the fourth pivot axis PA**4** when viewed from an axial direction D**2** parallel to the third pivot axis PA**3**. More specifically, the third pivot axis PA**3** is closer to the pedal axle **12** than the fourth pivot axis PA**4** when viewed from the axial direction D**2** parallel to the third pivot axis PA**3**.

While the third pivot axis PA**3** and the fourth pivot axis PA**4** are substantially parallel to the rotational axis A**1** in the illustrated embodiment, the third pivot axis PA**3** and the fourth pivot axis PA**4** do not need to be parallel to the rotational axis A**1**.

As seen in FIG. **2**, the third clamping member **28** is pivotable together with the second sub member **26** relative to the pedal body **14** about the third pivot axis PA**3**. In the illustrated embodiment, the third clamping member **28** is pivotable together with the second sub member **26** relative to the pedal body **14** about the third pivot axis PA**3** between an eleventh position P**11** and a twelfth position P**12**. The third clamping member **28** pivots relative to the pedal body **14** about the third pivot axis PA**3** between the eleventh position P**11** and the twelfth position P**12** in a state where the third clamping member **28** is positioned at the ninth position P**9** relative to the second sub member **26** (FIG. **4**). The eleventh position P**11** of the third clamping member **28** corresponds to the seventh position P**7** of the second sub member **26**. The twelfth position P**12** of the third clamping member **28** corresponds to the eighth position P**8** of the second sub member **26**.

As seen in FIG. **5**, the pedal body **14** includes a first frame **14***b* and a second frame **14***c*. The tubular part **14***a* extends in the axial direction D**2**. The tubular part **14***a* is rotatably supported on the pedal axle **12**. The first frame **14***b* is secured to the tubular part **14***a*. The second frame **14***c* is secured to the tubular part **14***a* and is opposite to the first frame **14***b*. The tubular part **14***a* and the first frame **14***b* defines a first space SP**1**. The first sub member **16** and the first clamping member **18** are at least partially provided in the first space SP**1**. The tubular part **14***a* and the second frame **14***c* defines a second space SP**2**. The second sub member **26** and the third clamping member **28** are at least partially provided in the second space SP**2**.

In the illustrated embodiment, the first frame **14***b* and the second frame **14***c* are integrally provided with the tubular part **14***a* as a single unitary member. However, at least one of the first frame **14***b* and the second frame **14***c* can be a separate member from the tubular part **14***a* if needed and/or desired.

As seen in FIG. **6**, the first sub member **16** is integrally provided with the fourth clamping member **30**. In the illustrated embodiment, the first sub member **16** is integrally

provided with the fourth clamping member **30** as a single unitary member. The fourth clamping member **30** is pivotable relative to the pedal body **14** about the first pivot axis PA**1** together with the first sub member **16**. The first sub member **16** can, however, be a separate member from the fourth clamping member **30**.

The first sub member **16** includes a pair of coupling portions **34** spaced apart from each other in the axial direction D**2**. The coupling portions **34** are coupled to each other by the fourth clamping member **30**. Each of the coupling portions **34** includes a first pivot hole **34***a* and a second pivot hole **34***b*. The first pivot shaft **24** (FIG. **5**) extends through the first pivot holes **34***a*. The second pivot shafts **25** respectively extend through the second pivot holes **34***b*.

As seen in FIG. **6**, the first clamping member **18** includes a clamping body **36** and a pair of attachment portions **38**. The clamping body **36** includes the first cleat engagement portion **22** configured to engage with the rear end **2***a* of the cleat **2** (FIG. **1**). The attachment portions **38** are coupled to each other by the clamping body **36**. The attachment portions **38** protrude from the clamping body **36** and are spaced apart from each other in the axial direction D**2**. Each of the attachment portions **38** includes a pivot hole **38***a*. The second pivot shaft **25** extends through the pivot hole **38***a* to pivotably support the first clamping member **18** relative to the first sub member **16** about the second pivot axis PA**2**.

In the illustrated embodiment, the attachment portions **38** are integrally provided with the clamping body **36** as a single unitary member. However, at least one of the attachment portions **38** can be a separate member from the clamping body **36** if needed and/or desired.

As seen in FIG. **7**, the first clamping member **18** further includes an adjustment plate **40** and an adjustment bolt **42**. The adjustment plate **40** has a threaded hole **40***a*. The adjustment bolt **42** includes a thread bolt **42***a*, a flange portion **42***b*, and a head portion **42***c*. The adjustment bolt **42** protrudes from the flange portion **42***b*. The head portion **42***c* protrudes from the flange portion **42***b* toward an opposite side of the thread bolt **42***a*. The thread bolt **42***a* is screwed in the threaded hole **40***a*. The flange portion **42***b* is provided between the adjustment plate **40** and the clamping body **36**. The flange portion **42***b* engages with the clamping body **36**. The clamping body **36** includes a through-hole **36***a*. The head portion **42***c* is provided in the through-hole **36***a*. The adjustment bolt **42** is rotatable relative to the clamping body **36** and the adjustment plate **40** about a center axis A**2** of the adjustment bolt **42**.

The clamping body **36** is configured to guide the adjustment plate **40** in an adjustment direction D**3** parallel to the center axis A**2** of the adjustment bolt **42**. The clamping body **36** is configured to prevent the adjustment plate **40** from rotating relative to the clamping body **36** about the center axis A**2**. Rotation of the adjustment bolt **42** relative to the clamping body **36** moves the adjustment plate **40** relative to the clamping body **36** in the adjustment direction D**3**.

As seen in FIG. **8**, the bicycle pedal **10** comprises a biasing structure **44**. The biasing structure **44** is configured to bias the first clamping member **18** in the fourth pivot direction D**14** and the first sub member **16** in the second pivot direction D**12**. The biasing structure **44** is configured to bias the first clamping member **18** toward the third position P**3**. The biasing structure **44** is configured to bias the first sub member **16** toward the first position P**1** in a state where the restriction part **16***a* restricts the first clamping member **18** from moving relative to the first sub member **16** in the second pivot direction D**12**. In the illustrated embodiment, the biasing structure **44** is configured to bias the first clamping member **18** (the adjustment plate **40**) toward the third position P**3** so that the first sub member **16** is biased toward the first position P**1**.

As seen in FIG. **5**, the biasing structure **44** includes a first biasing member **46**. In the illustrated embodiment, for example, the first biasing member **46** is a torsion spring. However, the first biasing member **46** can be a biasing member other than the torsion spring. Furthermore, the biasing structure **44** can include a plurality of biasing members to bias the first clamping member **18** and the first sub member **16**.

The first pivot shaft **24** extends through the first biasing member **46**. The first biasing member **46** is mounted to the pedal body **14** with the first pivot shaft **24**. Thus, the first biasing member **46** is mounted on the first pivot axis PA**1**. However, the first biasing member **46** can be mounted on the second pivot axis PA**2** or at the other location in the bicycle pedal body **10**.

As seen in FIG. **8**, the first biasing member **46** is configured to bias the first clamping member **18** relative to the pedal body **14** toward the third position P**3** in the fourth pivot direction D**14**. The first biasing member **46** includes a first end **46***a* and a second end **46***b*. The first end **46***a* is configured to engage with the pedal body **14**. The second end **46***b* is configured to engage with the first clamping member **18**.

In the illustrated embodiment, the first end **46***a* is configured to engage with the tubular part **14***a* of the pedal body **14**. The second end **46***b* is configured to engage with the adjustment plate **40** of the first clamping member **18** at an engagement point PE**1**. The first biasing member **46** is configured to bias the first sub member **16** relative to the pedal body **14** in the second pivot direction D**12** in a state where the first clamping member **18** is in contact with the restriction part **16***a* of the first sub member **16**.

A first biasing force FB**1** is applied to the first clamping member **18** (the adjustment plate **40**) by the first biasing member **46** at the engagement point PE**1**. The first biasing force FB**1** can be defined on the center axis A**2** of the adjustment bolt **42**, for example.

As seen in FIG. **8**, the second pivot axis PA**2** is closer to the center axis A**2** of the adjustment bolt **42** than the first pivot axis PA**1**. A first minimum distance L**1** is defined between the first pivot axis PA**1** and the center axis A**2**. A second minimum distance L**2** is defined between the second pivot axis PA**2** and a line intersecting with the engagement point PE**1** and parallel to the direction of the first biasing force FB**1**. The line is substantially identical with the center axis A**2** in the first embodiment. The second minimum distance L**2** is shorter than the first minimum distance L**1**.

In a step-in operation of the bicycle pedal **10**, a first torque T**1** is needed to pivot the first sub member **16** about the first pivot axis PA**1** in the first pivot direction D**11**. In a step-out operation of the bicycle pedal **10**, a second torque T**2** is needed to pivot the first clamping member **18** about the second pivot axis PA**2** in the third pivot direction D**13**. The first torque T**1** can be less than the second torque T**2**. In the illustrated embodiment, the first torque T**1** can also be defined as a torque to pivot the first clamping member **18** about the first pivot axis PA**1** toward the sixth position P**6** together with the first sub member **16**. The step-in operation is an operation in which a user (a rider) clips the cleat **2** of the shoe into the bicycle pedal **10**. The step-out operation is an operation in which the user (the rider) releases the cleat **2** of the shoe from the bicycle pedal **10**.

With the bicycle pedal **10**, a pivot axis of the first clamping member **18** is switched between the first pivot axis PA**1** and the second pivot axis PA**2** in the step-in operation and the step-out operation. The rationale to switch the pivot axis of the first clamping member **16** will be described below.

As seen in FIG. **9**, a first force FC**1** is applied from the cleat **2** to the first clamping member **18** in a step-in operation of the bicycle pedal **10**. In the illustrated embodiment, the first clamping member **18** includes a contact surface **18***a* configured to come into contact with the rear end **2***a* of the cleat **2**. The first force FC**1** directs in a direction perpendicular to the contact surface **18***a*. The first force FC**1** directs in a first force direction D**41** to provide a first force angle θ**1** between the first force direction D**41** and the cleat attachment plane PL**1** defined by the first clamping member **18** and the second clamping member **20**.

As seen in FIG. **9**, a first total force FT**1** of the first biasing force FB**1** and the first force FC**1** is applied to the first clamping member **18** in the step-in operation of the bicycle pedal **10**. It can be thought that the first total force FT**1** is applied at the second pivot axis PA**2**. Since the first total force FT**1** is offset from the first pivot axis PA**1** and the first total force FT**1** is inclined downwardly with respect to a line including the first pivot axis PA**1** and the second pivot axis PA**2**, a first rotational moment M**1** (a first sub torque) is applied to the first sub member **16** about the first pivot axis PA**1** in the first pivot direction D**11**. Thus, the first sub member **16** is moved relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11**.

Namely, the first sub member **16**, the first pivot axis PA**1**, the first clamping member **18**, the second pivot axis PA**2** and the biasing structure **44** are configured such that the first sub member **16** is moved relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11** in a state where the first force FC**1** to move the first clamping member **18** in the first pivot direction D**11** is applied to the first clamping member **18**. More specifically, the first sub member **16** and the first clamping member **18** are pivoted relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11** in the step-in operation of the bicycle pedal **10**.

On the other hand, as seen in FIG. **10**, a second force FC**2** is applied from the cleat **2** to the first clamping member **18** in a step-out operation of the bicycle pedal. During the step-out operation, the user twists the shoe about a vertical axis to apply the second force FC**2** via the cleat **2** to the first clamping member **18**.

The first force FC**1** directs in a direction different from a direction of the second force FC**2**. The second force FC**2** directs in a second force direction D**42** to provide a second force angle θ**2** between the second force direction D**42** and the cleat attachment plane PL**1**. Unlike the step-in operation, the second force FC**2** directs in the second force direction D**42** substantially parallel to the cleat attachment plane PL**1** since the cleat **2** is twisted about the vertical axis substantially perpendicular to the cleat attachment plane PL**1**.

As seen in FIGS. **9** and **10**, the first force angle θ**1** is larger than the second force angle θ**2**. In the illustrated embodiment, for example, the first force angle θ**1** is approximately 45 degrees while the second force angle θ**2** is approximately 0 degrees.

As seen in FIG. **10**, a second total force FT**2** of the first biasing force FB**1** and the second force FC**2** is applied to the first clamping member **18** in the step-out operation of the bicycle pedal **10**. It can be thought that the second total force FT**2** is applied at the second pivot axis PA**2**. Since the second total force FT**2** is offset from the first pivot axis PA**1** and the second total force FT**2** is inclined upwardly with respect to the line including the first pivot axis PA**1** and the second pivot axis PA**2**, a second rotational moment M**2** (a second sub torque) is applied to the first sub member **16** about the first pivot axis PA**1** in the second pivot direction D**12**. Thus, the first sub member **16** stays at the first position P**1** with being restricted by restricting portion **21** or is moved relative to the pedal body **14** about the first pivot axis PA**1** in the second pivot direction D**12** until the first sub member **16** contacts the restricting portion **21**.

Namely, the first sub member **16**, the first pivot axis PA**1**, the first clamping member **18**, the second pivot axis PA**2** and the biasing structure **44** are configured such that the first sub member **16** stays or is moved relative to the pedal body **14** about the first pivot axis PA**1** in the second pivot direction D**12** in a state where the second force FC**2** to move the first clamping member **18** in the third pivot direction D**13** is applied to the first clamping member **18**.

More specifically, in a state where the restricting portion **21** (FIG. **3**) restricts the first sub member **16** from pivoting in the second pivot direction D**12** relative to the pedal body **14**, the first sub member **16** stays at the first position P**1** relative to the pedal body **14** in the step-out operation. At this time, the first clamping member **18** is pivoted about the second pivot axis PA**2** relative to the first sub member **16** in the third pivot direction D**13** due to the second force FC**2**.

In a state where the first sub member **16** is spaced apart from the restricting portion **21** (FIG. **3**), the first sub member **16** is moved relative to the pedal body **14** about the first pivot axis PA**1** in the second pivot direction D**12** in the step-out operation. At this time, the first clamping member **18** is pivoted about the second pivot axis PA**2** relative to the first sub member **16** in the third pivot direction D**13** due to the second force FC**2**. After the first sub member **16** comes into contact with the restricting portion **21**, the first sub member **16** stays at the first position P**1** relative to the pedal body **14**, and the first clamping member **18** is further pivoted about the second pivot axis PA**2** relative to the first sub member **16** in the third pivot direction D**13** due to the second force FC**2**.

As seen in FIG. **11**, the first total force FT**1** is defined on a first virtual line LV**1** passing through the second pivot axis PA**2** when viewed from the axial direction D**2** (a direction perpendicular to a paper surface of FIG. **11**). The second total force FT**2** is defined on a second virtual line LV**2** passing through the second pivot axis PA**2** when viewed from the axial direction D**2**. The second virtual line LV**2** intersects with the first virtual line LV**1** at the second pivot axis PA**2** to provide a third angle θ**3** between the first virtual line LV**1** and the second virtual line LV**2**. In the illustrated embodiment, the third angle θ**3** is an acute angle. The first pivot axis PA**1** is disposed in an area AR**1** defined between the first virtual line LV**1** and the second virtual line LV**2** with the third angle θ**3** when viewed from the axial direction D**2**.

With the bicycle pedal **10**, as seen in FIG. **4**, the first pivot axis PA**1** is closer to the point PT**1** on the pedal axle **14** than the second pivot axis PA**2** when viewed from the axial direction D**2** parallel to the first pivot axis PA**1**. This arrangement enables switching the pivot axis of the first clamping member **18** between the first pivot axis PA**1** and the second pivot axis PA**2** in the step-in operation and the step-out operation. Thus, the first torque T**1** to pivot the first sub member **16** about the first pivot axis PA**1** in the first pivot direction D**11** in the step-in operation can be less than the second torque T**2** to pivot the first clamping member **18** about the second pivot axis PA**2** in the third pivot direction D**13** in the step-out operation, by adjusting biasing force

applied to the first clamping member **18** and the first sub member, respectively. Accordingly, it is possible to make the step-in operation easier for the user while the cleat **2** is strongly held by the bicycle pedal **10** so that the cleat **2** is prevented from being unintentionally released from the bicycle pedal **10**.

Second Embodiment

A bicycle pedal **210** in accordance with a second embodiment will be described below referring to FIGS. **12** to **14**. The bicycle pedal **210** has the same configuration as the bicycle pedal **10** except for the biasing structure **44**. Thus, elements having substantially the same function as those in the first embodiment will be numbered the same here, and will not be described and/or illustrated again in detail here for the sake of brevity.

As seen in FIG. **12**, the bicycle pedal **210** comprises a biasing structure **244**. The biasing structure **244** includes the first biasing member **46** and a second biasing member **248**.

As seen in FIG. **13**, the biasing structure **244** is configured to bias the first clamping member **18** in the fourth pivot direction D**14** and the first sub member **16** in the second pivot direction D**12**. The second biasing member **248** is configured to bias the first clamping member **18** relative to the first sub member **16** in the fourth pivot direction D**14**.

The second biasing member **248** includes a third end **248***a* and a fourth end **248***b*. The third end **248***a* is configured to engage with the first sub member **16**. The fourth end **248***b* is configured to engage with the clamping body **36**. The first pivot shaft **24** extends through the second biasing member **248**. The second biasing member **248** includes a coiled body **248***c* configured to generate a biasing force. The third end **248***a* and the fourth end **248***b* are connected with both ends of the coiled body **248***c*, respectively. The first pivot shaft **24** extends through the coiled body **248***c*.

As seen in FIG. **14**, the first sub member **16** includes a pair of engagement portions **235**. The engagement portions **235** extends from the coupling portions **34**, respectively. As seen in FIG. **13**, the third end **248***a* is configured to engage with one of the engagement portions **235**.

As seen in FIG. **13**, the second biasing member **248** is configured to apply a biasing force FB**23** to the first sub member **16** at a third point PT**23** defined between the third end **248***a* and the first sub member **16**. The second biasing member **248** is configured to apply a biasing force FB**24** to the first clamping member **18** at a fourth point PT**24** defined between the fourth end **248***b* and the first clamping member **18**. A distance L**21** between the first pivot axis PA**1** and the third point PT**23** is shorter than a distance L**22** between the first pivot axis PA**1** and the fourth point PT**24**. The distance L**21** is shorter than a distance L**23** between the first pivot axis PA**1** and the second pivot axis PA**2**.

As described in the first embodiment, in the step-in operation of the bicycle pedal **210**, the first sub member **16** and the first clamping member **18** pivot relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11**. Thus, only the first biasing member **46** (FIG. **12**) is compressed between the pedal body **14** and the first clamping member **18** in the step-in operation.

In the step-out operation of the bicycle pedal **210**, the first clamping member **18** pivots relative to the first sub member **16** about the second pivot axis PA**2** in the third pivot direction D**13**. Thus, the first biasing member **46** (FIG. **12**) and the second biasing member **248** are compressed between the first sub member **16** and the first clamping member **18**.

Namely, the first sub member **16**, the first pivot axis PA**1**, the first clamping member **18**, the second pivot axis PA**2** and the biasing structure **244** are configured such that a first torque T**21** to pivot the first sub member **16** about the first pivot axis PA**1** toward the second position P**2** is less than a second torque T**22** to pivot the first clamping member **18** about the second pivot axis PA**2** toward the fourth position P**4**. Accordingly, it is possible to make the step-in operation easier for the user while the cleat **2** is strongly held by the bicycle pedal **210** so that the cleat **2** is prevented from being unintentionally released from the bicycle pedal **210**.

As seen in FIG. **13**, since the distance L**21** is shorter than the distance L**22**, a third rotational moment M**23** caused by the biasing force FB**23** about the first pivot axis PA**1** is smaller than the second rotational moment M**2**. Thus, the third rotational moment M**23** does not prevent the second rotational moment M**2** from pivoting the first sub member **16** about the first pivot axis PA**1** in the second pivot direction D**12** in the step out operation.

With the bicycle pedal **210**, as seen in FIG. **13**, since the first pivot axis PA**1** is closer to the point PT**1** on the pedal axle **14** than the second pivot axis PA**2** when viewed from the axial direction D**2** parallel to the first pivot axis PA**1**, it is possible to obtain substantially the same advantageous effect as that of the bicycle pedal **10** in accordance with the first embodiment.

Third Embodiment

A bicycle pedal **310** in accordance with a third embodiment will be described below referring to FIGS. **15** to **22**. The bicycle pedal **310** has the same configuration as the bicycle pedal **10** except for the biasing structure **44**. Thus, elements having substantially the same function as those in the above embodiments will be numbered the same here, and will not be described and/or illustrated again in detail here for the sake of brevity.

As seen in FIG. **15**, the bicycle pedal **310** comprises a biasing structure **344**. The biasing structure **344** includes a first biasing member **346** and a second biasing member **348**.

As seen in FIG. **16**, the biasing structure **344** is configured to bias the first clamping member **18** in the fourth pivot direction D**14** and the first sub member **16** in the second pivot direction D**12**. The first biasing member **346** is configured to bias the first clamping member **18** relative to the pedal body **14** in the fourth pivot direction D**14** as well as the first biasing member **46** in accordance with the first embodiment. The second biasing member **348** is configured to bias the first clamping member **18** relative to the first sub member **16** in the fourth pivot direction D**14** as well as the second biasing member **246** in accordance with the second embodiment. The first biasing member **346** has substantially the same function as that of the first biasing member **46** in accordance with the first embodiment. The second biasing member **348** has substantially the same function as that of the second biasing member **248** in accordance with the second embodiment. However, the first biasing member **346** and the second biasing embodiment **348** have different constructions from the constructions of the first biasing member **46** and the second biasing member **248**.

The first biasing member **346** includes a first end **346***a* and a second end **346***b*. The first end **346***a* is configured to engage with the pedal body **14**. The second end **346***b* is configured to engage with the first clamping member **18**. In the illustrated embodiment, the first end **346***a* is configured to engage with the tubular part **14***a* of the pedal body **14**. The second end **346***b* is configured to engage with the clamping

body **36** and/or one of the attachment portions **38** instead of the adjustment plate **44**. In the illustrated embodiment, the adjustment plate **40** and the adjustment bolt **42** are omitted from the first clamping member **18**.

As seen in FIGS. **16** and **17**, the second biasing member **348** includes a third end **348***a* and a fourth end **348***b*. The third end **348***a* is configured to engage with the first sub member **16**. The fourth end **348***b* is configured to engage with the first clamping member **18**. In the illustrated embodiment, the fourth end **348***b* is configured to engage with the clamping body **36**. The second biasing member **348** includes a coiled body **348***c* configured to generate a biasing force. The third end **348***a* and the fourth end **348***b* are connected with both ends of the coiled body **348***c*, respectively.

As seen in FIGS. **18** and **19**, each of the coupling portions **34** of the first sub member **16** includes a through-hole **365**. The third end **348***a* is inserted in one of the through-holes **365**. More specifically, the third end **348***a* of the second biasing member **348** includes a contact part **348***d* configured to contact the first sub member **16**. The third end **348***a* includes an arm part **348***e*. The contact part **348***d* extends from the arm part **348***e* in the axial direction D**2**. The contact part **348***d* inserted in one of the through-hole **365** to transmit the biasing force from the second biasing member **348** to the first sub member **16**.

As seen in FIG. **17**, the biasing structure **344** includes a biasing support **360** configured to support the second biasing member **348** to be pivotable relative to the first sub member **16** about a biasing pivot axis PB**1**. The biasing pivot axis PB**1** is substantially coaxial with the first pivot axis PA**1**. More specifically, the biasing pivot axis PB**1** is coaxial with the first pivot axis PA**1**.

The biasing support **360** includes a movable part **362** and a pivot part **364**. The movable part **362** is spaced apart from the biasing pivot axis PB**1**. The movable part **362** is spaced apart from the biasing pivot axis PB**1**, the first pivot axis PA**1**, and the second pivot axis PA**2**. The second biasing member **348** is mounted to the movable part **362**.

As seen in FIGS. **18** and **19**, the movable part **362** extends in a direction substantially parallel to the biasing pivot axis PB**1**. In the illustrated embodiment, the movable part **362** extends in the axial direction D**2**. The movable part **362** extends through the coiled body **348***c*.

The pivot part **364** is configured to pivotably support the movable part **362** relative to the pedal body **14** about the biasing pivot axis PB**1**. The pivot part **364** includes a first pivot part **366** and a second pivot part **368**. The movable part **362** includes a first movable end **362***a* and a second movable end **362***b*. The first pivot part **366** is provided at the first movable end **362***a*. The second pivot part **368** is provided at the second movable end **362***b*. The first pivot part **366** extends from the first movable end **362***a* in the radial direction perpendicular to the biasing pivot axis PB**1**. The second pivot part **368** extends from the second movable end **362***b* in the radial direction perpendicular to the biasing pivot axis PB**1**.

As seen in FIGS. **18** and **19**, each of the first pivot part **366** and the second pivot part **368** is pivotally mounted to the first pivot shaft **24**. The first pivot part **366** includes a first hole **366***a*. The second pivot part end **368** includes a second hole **368***a*. The first pivot shaft **24** extends through the first hole **366***a* and the second hole **368***a*. The biasing support **360** is pivotable relative to the first sub member **16** and the first clamping member **18** (FIG. **18**) about the first pivot axis PA**1**.

As seen in FIG. **17**, the movable part **362** is provided between the pedal axle **12** and the second pivot axis PA**2** when viewed from the axial direction D**2** parallel to the rotational axis A**1** (a direction perpendicular to a paper surface of FIG. **17**). The movable part **362** is closer to the pedal axle **12** than the second pivot axis PA**2** when viewed from the axial direction D**2** parallel to the rotational axis A**1**. The movable part **362** is closer to the first cleat engagement portion **22** than the first pivot axis PA**1** when viewed from the axial direction D**2** parallel to the rotational axis A**1**. The contact part **348***d* is closer to the first cleat engagement portion **22** than the first pivot axis PA**1** when viewed from the axial direction D**2** parallel to the rotational axis A**1**.

As seen in FIG. **20**, a first biasing force FB**31** is applied to the first clamping member **18** (the clamping body **36**) by the first biasing member **46**. A first total force FT**31** of the first biasing force FB**31** and the first force FC**1** is applied to the first clamping member **18** in the step-in operation of the bicycle pedal **10**. It can be thought that the first total force FT**31** is applied at the second pivot axis PA**2**. Since the first total force FT**31** is offset from the first pivot axis PA**1**, a first rotational moment M**31** (a first sub torque) is applied to the first sub member **16** about the first pivot axis PA**1** in the first pivot direction D**11**. Thus, the first sub member **16** is moved relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11**.

Namely, the first sub member **16**, the first pivot axis PA**1**, the first clamping member **18**, the second pivot axis PA**2** and the biasing structure **344** are configured such that the first sub member **16** is moved relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11** in a state where the first force FC**1** to move the first clamping member **18** in the first pivot direction D**11** is applied to the first clamping member **18**. More specifically, the first sub member **16** and the first clamping member **18** are pivoted relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11** in the step-in operation of the bicycle pedal **10**.

On the other hand, as seen in FIG. **21**, a second total force FT**32** of the first biasing force FB**31** and the second force FC**2** is applied to the first clamping member **18** in the step-out operation of the bicycle pedal **10**. It can be thought that the second total force FT**32** is applied at the second pivot axis PA**2**. Further, a third total force FT**33** of the second force FC**2** and a biasing force FB**34** made by the fourth end **348***b* is applied to the first clamping member **18** in the step out operation of the bicycle pedal **10**. Furthermore, a biasing force FB**33** made by the third end **348***a* is applied to the first sub member **16**. Since the second total force FT**32** is offset from the first pivot axis PA**1**, a second rotational moment M**32** (a second sub torque) is applied to the first sub member **16** about the first pivot axis PA**1** in the second pivot direction D**12**. Further, a third rotational moment M**33** caused by the third total force FT**33** is applied to the first sub member **16** about the first pivot axis PA**1** in the first pivot direction D**11**. Furthermore, a fourth rotational moment M**34** caused by the third biasing force FB**33** is applied to the first sub member **16** about the first pivot axis PA**1** in the second pivot direction D**12**. The total moment of the first, second and third rotational moments M**32**, M**33** and M**34** is applied to the first sub member **16** about the first pivot axis PA**1** in the second pivot direction D**12**. Thus, the first sub member **16** stays at the first position P**1** or is moved relative to the pedal body **14** about the first pivot axis PA**1** in the second pivot direction D**12**.

Namely, the first sub member **16**, the first pivot axis PA**1**, the first clamping member **18**, the second pivot axis PA**2** and the biasing structure **344** are configured such that the first sub member **16** stays or is moved relative to the pedal body

14 about the first pivot axis PA1 in the second pivot direction D12 in a state where the second force FC2 to move the first clamping member 18 in the third pivot direction D13 is applied to the first clamping member 18, as well as the first embodiment.

In a state where the restricting portion 21 (FIG. 3) restricts the first sub member 16 from pivoting in the second pivot direction D12 relative to the pedal body 14, the first sub member 16 stays at the first position P1 relative to the pedal body 14 in the step-out operation. At this time, the first clamping member 18 is pivoted about the second pivot axis PA2 relative to the first sub member 16 in the third pivot direction D13 due to the second force FC2.

In a state where the first sub member 16 is spaced apart from the restricting portion 21 (FIG. 3), the first sub member 16 is moved relative to the pedal body 14 about the first pivot axis PA1 in the second pivot direction D12 in the step-out operation. At this time, the first clamping member 18 is pivoted about the second pivot axis PA2 relative to the first sub member 16 in the third pivot direction D13 due to the second force FC2. After the first sub member 16 comes into contact with the restricting portion 21, the first sub member 16 stays at the first position P1 relative to the pedal body 14, and the first clamping member 18 is further pivoted about the second pivot axis PA2 relative to the first sub member 16 in the third pivot direction D13 due to the second force FC2.

As seen in FIG. 17, the second biasing member 348 is configured to apply a biasing force FB33 to the first sub member 16 at a third point PT33 defined between the third end 348*a* and the first sub member 16. The second biasing member 348 is configured to apply a biasing force FB34 to the first clamping member 18 at a fourth point PT34 defined between the fourth end 348*b* and the first clamping member 18. A distance L51 between the first pivot axis PA1 and the third point PT33 is shorter than a distance L52 between the first pivot axis PA1 and the fourth point PT34.

For example, the third point PT33 is defined on a center axis of the contact part 348*d* of the third end 348*a*. The third point PT33 is closer to the first cleat engagement portion 22 than the first pivot axis PA1 when viewed from the axial direction D2 parallel to the rotational axis A1. Thus, the biasing force FB33 provides the moment M34 about the first pivot axis PA1 to the first sub member 16 in the second pivot direction D12 in the step-out operation.

In the illustrated embodiment, the biasing force FB33 can be defined on a line L33 perpendicular to the third end 348*a* extends when viewed from the axial direction D2 parallel to the rotational axis A1. The line L33 is offset from the first pivot axis PA1 and is disposed between the first cleat engagement portion 22 and the first pivot axis PA1. Thus, the biasing force FB33 causes the first sub member 16 to pivot relative to the pedal body 14 about the first pivot axis PA1 in the second pivot direction D12.

In the step-in operation of the bicycle pedal 310, the first sub member 16 and the first clamping member 18 pivot relative to the pedal body 14 about the first pivot axis PA1 in the first pivot direction D11. Thus, only the first biasing member 346 (FIG. 16) is compressed between the pedal body 14 and the first clamping member 18 in the step-in operation.

In the step-out operation of the bicycle pedal 310, the first clamping member 18 pivots relative to the first sub member 16 about the second pivot axis PA2 in the third pivot direction D13. Thus, the first biasing member 346 (FIG. 16) and the second biasing member 248 are compressed between the first sub member 16 and the first clamping member 18.

Namely, the first sub member 16, the first pivot axis PA1, the first clamping member 18, the second pivot axis PA2 and the biasing structure 44 are configured such that a first torque T31 to pivot the first sub member 16 about the first pivot axis PA1 toward the second position P2 is less than a second torque T32 to pivot the first clamping member 18 about the second pivot axis PA2 toward the fourth position P4. Accordingly, it is possible to make the step-in operation easier for the user while the cleat 2 is strongly held by the bicycle pedal 310 so that the cleat 2 is prevented from being unintentionally released from the bicycle pedal 310.

With the bicycle pedal 310, as seen in FIG. 16, the first pivot axis PA1 is closer to the point PT1 on the pedal axle 14 than the second pivot axis PA2 when viewed from the axial direction D2 parallel to the first pivot axis PA1. This arrangement enables switching the pivot axis of the first clamping member 18 between the first pivot axis PA1 and the second pivot axis PA2 in the step-in operation and the step-out operation. Thus, the first torque T31 to pivot the first sub member 16 about the first pivot axis PA1 in the first pivot direction D11 in the step-in operation is less than the second torque T32 to pivot the first clamping member 18 about the second pivot axis PA2 in the third pivot direction D13 in the step-out operation. Accordingly, it is possible to make the step-in operation easier for the user while the cleat 2 is strongly held by the bicycle pedal 310 so that the cleat 2 is prevented from being unintentionally released from the bicycle pedal 310.

Fourth Embodiment

A bicycle pedal 410 in accordance with a fourth embodiment will be described below referring to FIGS. 23 to 27. The bicycle pedal 410 has the same configuration as the bicycle pedal 310 except for the biasing structure 344. Thus, elements having substantially the same function as those in the above embodiments will be numbered the same here, and will not be described and/or illustrated again in detail here for the sake of brevity.

As seen in FIG. 23, the bicycle pedal 410 comprises a biasing structure 444. The biasing structure 444 includes the first biasing member 346 and a second biasing member 448.

As seen in FIG. 24, the biasing structure 444 is configured to bias the first clamping member 18 in the fourth pivot direction D14 and the first sub member 16 in the second pivot direction D12. The second biasing member 448 is configured to bias the first clamping member 18 relative to the first sub member 16 in the fourth pivot direction D14 as well as the second biasing member 348 in accordance with the third embodiment. The second biasing member 448 has substantially the same function as that of the second biasing member 348 in accordance with the third embodiment. However, the second biasing embodiment 448 have different constructions from the construction of the second biasing member 348.

As seen in FIGS. 24 and 25, the second biasing member 448 includes a third end 448*a* and a fourth end 448*b*. The third end 448*a* is configured to engage with the first sub member 16. The fourth end 448*b* is configured to engage with the first clamping member 18. In the illustrated embodiment, the fourth end 348*b* is configured to engage with the clamping body 36. The clamping body 36 of the first clamping member 18 includes an attachment hole 470. The fourth end 448*b* is inserted in the attachment hole 470. The second biasing member 448 includes a coiled body 448*c* configured to generate a biasing force. The third end 448*a*

and the fourth end **448***b* are connected with both ends of the coiled body **448***c*, respectively.

As seen in FIGS. **26** and **27**, each of the coupling portions **34** of the first sub member **16** includes a through-hole **465**. The third end **448***a* is inserted in one of the through-holes **465**. More specifically, the third end **448***a* of the second biasing member **448** includes a contact part **448***d* configured to contact the first sub member **16**. The third end **448***a* includes an arm part **448***e*. The contact part **448***d* extends from the arm part **448***e* in a direction parallel to the first pivot axis PA**1**. The contact part **448***d* is inserted in one of the through-hole **465** to transmit the biasing force from the second biasing member **448** to the first sub member **16**.

As seen in FIG. **25**, the biasing structure **444** includes a biasing support **460** configured to support the second biasing member **448** to be pivotable relative to the first sub member **16** about a biasing pivot axis PB**41**. Unlike the biasing support **360** in accordance with the third embodiment, the biasing pivot axis PB**41** is not coaxial with the first pivot axis PA**1**. The biasing pivot axis PB**41** is spaced apart from the first pivot axis PB**1** and the second pivot axis PB**2** when viewed from the axial direction D**2** parallel to the rotational axis A**1**.

The biasing support **460** includes a movable part **462** and a pivot part **464**. The movable part **462** is spaced apart from the biasing pivot axis PB**41**. The movable part **462** is spaced apart from the biasing pivot axis PB**1** and the first pivot axis PA**1**. The second biasing member **448** is mounted to the movable part **462**.

As seen in FIGS. **26** and **27**, the movable part **462** extends in a direction substantially parallel to the biasing pivot axis PB**41**. In the illustrated embodiment, the movable part **462** extends in the axial direction D**2**. The movable part **462** extends through the coiled body **448***c*.

The pivot part **464** is configured to pivotably support the movable part **462** relative to the pedal body **14** about the biasing pivot axis PB**41**. The pivot part **464** is configured to be pivotably connected to the pedal body **14**. The pivot part **464** includes a first pivot part **466** and a second pivot part **468**. The movable part **462** includes a first movable end **462***a* and a second movable end **462***b*. The first pivot part **466** is provided at the first movable end **462***a*. The second pivot part **468** is provided at the second movable end **462***b*.

The first pivot part **466** includes a first connecting part **466***a* and a first shaft **466***b*. The first connecting part **466***a* extends from the first movable end **462***a* in the radial direction perpendicular to the biasing pivot axis PB**41**. The first shaft **466***b* extends from an end of the first connecting part **466***a* along the biasing pivot axis PB**41**.

The second pivot part **468** includes a second connecting part **468***a* and a second shaft **468***b*. The second connecting part **468***a* extends from the second movable end **462***b* in the radial direction perpendicular to the biasing pivot axis PB**41**. The second shaft **468***b* extends from an end of the second connecting part **468***a* along the biasing pivot axis PB**41**. The second shaft **468***b* is coaxial with the first shaft **466***b*.

As seen in FIG. **27**, each of the first pivot part **466** and the second pivot part **468** is pivotally mounted to the pedal body **14**. The pedal body **14** includes a first support hole **470** and a second support hole **472**. The first shaft **466***b* is inserted in the first support hole **470**. The second shaft **468***b* is inserted in the second support hole **472**. The first pivot part **466** and the second pivot part **468** define the biasing pivot axis PB**41**. The biasing support **360** is pivotable relative to the first sub member **16** and the first clamping member **18** about the biasing pivot axis PB**41**.

As seen in FIG. **24**, the biasing pivot axis PB**41** is closer to the first cleat engagement portion **22** than the second pivot axis PA**2** when viewed from the axial direction D**2** parallel to the rotational axis A**1** (a direction perpendicular to a paper surface of FIG. **24**). The biasing pivot axis PB**41** is closer to the first cleat engagement portion **22** than the first pivot axis PA**1** when viewed from the axial direction D**2** parallel to the rotational axis A**1**. The biasing pivot axis PB**41** is closer to the pedal axle **12** than the second pivot axis PA**2** when viewed from the axial direction D**2** parallel to the rotational axis A**1**.

When viewed from the axial direction D**2** parallel to the rotational axis A**1**, the second pivot axis PA**2** is disposed within an outline OL**1** of the second biasing member **448** in a state where the first clamping member **18** is disposed at a rest position where the first clamping member **18** is free from a force from the cleat **2**. When viewed from the axial direction D**2** parallel to the rotational axis A**1**, the second pivot axis PA**2** is disposed within the outline OL**2** of the coiled body **448***c* of second biasing member **448** in the state where the first clamping member **18** is disposed at the rest position where the first clamping member **18** is free from a force from the cleat **2**. In the illustrated embodiment, the rest position of the first clamping member **18** is the third position P**3** and the fifth position P**5**. The contact part **448***d* is closer to the first cleat engagement portion **22** than the first pivot axis PA**1** when viewed from the axial direction D**2** parallel to the rotational axis A**1**.

As seen in FIG. **25**, the second biasing member **448** is configured to apply a biasing force FB**43** to the first sub member **16** at a third point PT**43** defined between the third end **448***a* and the first sub member **16**. The second biasing member **448** is configured to apply a biasing force FB**44** to the first clamping member **18** at a fourth point PT**44** defined between the fourth end **448***b* and the first clamping member **18**. A distance L**61** between the first pivot axis PA**1** and the third point PT**43** is shorter than a distance L**62** between the first pivot axis PA**1** and the fourth point PT**44**.

In the step-in operation of the bicycle pedal **410**, the first sub member **16** and the first clamping member **18** pivot relative to the pedal body **14** about the first pivot axis PA**1** in the first pivot direction D**11**. Thus, only the first biasing member **346** (FIG. **16**) is compressed between the pedal body **14** and the first clamping member **18** in the step-in operation.

In the step-out operation of the bicycle pedal **410**, the first clamping member **18** pivots relative to the first sub member **16** about the second pivot axis PA**2** in the third pivot direction D**13**. Thus, the first biasing member **346** (FIG. **24**) and the second biasing member **448** are compressed between the first sub member **16** and the first clamping member **18**.

Namely, the first sub member **16**, the first pivot axis PA**1**, the first clamping member **18**, the second pivot axis PA**2** and the biasing structure **444** are configured such that a first torque T**41** to pivot the first sub member **16** about the first pivot axis PA**1** toward the second position P**2** is less than a second torque T**42** to pivot the first clamping member **18** about the second pivot axis PA**2** toward the fourth position P**4**. Accordingly, it is possible to make the step-in operation easier for the user while the cleat **2** is strongly held by the bicycle pedal **410** so that the cleat **2** is prevented from being unintentionally released from the bicycle pedal **410**.

With the bicycle pedal **410**, as seen in FIG. **24**, since the first pivot axis PA**1** is closer to the point PT**1** on the pedal axle **14** than the second pivot axis PA**2** when viewed from the axial direction D**2** parallel to the first pivot axis PA**1**, it

is possible to obtain substantially the same advantageous effect as that of the bicycle pedal **310** in accordance with the third embodiment.

It will be apparent to those skilled in the bicycle field from the present disclosure that feathers of the first to fourth embodiments can be combined with each other if needed and/or desired.

The term "comprising" and its derivatives, as used herein, are intended to be open ended terms that specify the presence of the stated features, elements, components, groups, integers, and/or steps, but do not exclude the presence of other unstated features, elements, components, groups, integers and/or steps. This concept also applies to words of similar meaning, for example, the terms "have", "include" and their derivatives.

The terms "member", "section", "portion", "part" and "element" when used in the singular can have the dual meaning of a single part or a plurality of parts.

The ordinal numbers such as "first" and "second" recited in the present application are merely identifiers, but do not have any other meanings, for example, a particular order and the like. Moreover, for example, the term "first element" itself does not imply an existence of "second element", and the term "second element" itself does not imply an existence of "first element."

The term "pair of", as used herein, can encompass the configuration in which the pair of elements have different shapes or structures from each other in addition to the configuration in which the pair of elements have the same shapes or structures as each other.

Finally, terms of degree such as "substantially", "about" and "approximately" as used herein mean a reasonable amount of deviation of the modified term such that the end result is not significantly changed.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

What is claimed is:

1. A bicycle pedal comprising:

a pedal axle;

a pedal body rotatably supported on the pedal axle about a rotational axis;

a first sub member movably coupled to the pedal body, the first sub member being movable relative to the pedal body about a first pivot axis in a first pivot direction and a second pivot direction opposite to the first pivot direction;

a first clamping member movably coupled to the first sub member, the first clamping member being movable relative to the first sub member about a second pivot axis substantially parallel to the first pivot axis in a third pivot direction and a fourth pivot direction opposite to the third pivot direction;

a second clamping member coupled to the pedal body to clamp a cleat together with the first clamping member;

a first pivot shaft defining the first pivot axis;

a second pivot shaft defining the second pivot axis, the second pivot shaft being attached to the first sub member to pivotably support the first clamping member about the second pivot axis; and

a biasing structure configured to bias the first clamping member in the fourth pivot direction and the first sub member in the second pivot direction, the first pivot axis being closer to a point on the pedal axle than the second pivot axis when viewed from an axial direction parallel to the first pivot axis.

2. The bicycle pedal according to claim **1**, wherein

the first pivot axis is substantially parallel to the rotational axis, and

the first pivot axis is closer to the pedal axle than the second pivot axis when viewed from the axial direction parallel to the first pivot axis.

3. The bicycle pedal according to claim **1**, wherein

the first clamping member includes a first cleat engagement portion configured to engage the cleat in a state where the first clamping member and the second clamping member clamp the cleat, and

the second pivot axis is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

4. The bicycle pedal according to claim **1**, wherein

the first sub member is coupled to the pedal body via the first pivot shaft to be movable relative to the pedal body about the first pivot axis between a first position and a second position,

the first clamping member is coupled to the first sub member via the second pivot shaft to be movable relative to the first sub member about the second pivot axis between a third position and a fourth position, and

the first pivot shaft is closer to the point on the pedal axle than the second pivot shaft when viewed from the axial direction such that a first torque to pivot the first sub member about the first pivot axis toward the second position against a biasing force of the biasing structure is less than a second torque to pivot the first clamping member about the second pivot axis toward the fourth position against the biasing force of the biasing structure.

5. The bicycle pedal according to claim **1**, wherein

the first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure are configured such that the first sub member is moved relative to the pedal body about the first pivot axis in the first pivot direction in a state where a first force to move the first clamping member in the first direction is applied to the first clamping member, and

the first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure are configured such that the first sub member stays or is moved relative to the pedal body about the first pivot axis in the second pivot direction in a state where a second force to move the first clamping member in the third direction is applied to the first clamping member, the first force directing in a direction different from a direction of the second force.

6. The bicycle pedal according to claim **5**, wherein

the first force is applied from the cleat to the first clamping member in a step-in operation of the bicycle pedal, and

the second force is applied from the cleat to the first clamping member in a step-out operation of the bicycle pedal.

7. The bicycle pedal according to claim **6**, wherein

the first force directs in a first force direction to provide a first force angle between the first force direction and a cleat attachment plane defined by the first clamping member and the second clamping member,

the second force directs in a second force direction to provide a second force angle between the second force direction and the cleat attachment plane, and

the first force angle is larger than the second force angle.

8. The bicycle pedal according to claim 3, wherein
the biasing structure includes
a first biasing member configured to bias the first clamping member relative to the pedal body in the fourth pivot direction, and
a second biasing member configured to bias the first clamping member relative to the first sub member in the fourth pivot direction.

9. A bicycle pedal comprising:
a pedal axle;
a pedal body rotatably supported on the pedal axle about a rotational axis;
a first sub member movably coupled to the pedal body, the first sub member being movable relative to the pedal body about a first pivot axis in a first pivot direction and a second pivot direction opposite to the first pivot direction;
a first clamping member movably coupled to the first sub member, the first clamping member being movable relative to the first sub member about a second pivot axis substantially parallel to the first pivot axis in a third pivot direction and a fourth pivot direction opposite to the third pivot direction;
a second clamping member coupled to the pedal body to clamp a cleat together with the first clamping member; and
a biasing structure configured to bias the first clamping member in the fourth pivot direction and the first sub member in the second pivot direction, the first pivot axis being closer to a point on the pedal axle than the second pivot axis when viewed from an axial direction parallel to the first pivot axis,
the first clamping member including a first cleat engagement portion configured to engage the cleat in a state where the first clamping member and the second clamping member clamp the cleat,
the second pivot axis being closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis,
the biasing structure including
a first biasing member configured to bias the first clamping member relative to the pedal body in the fourth pivot direction, and
a second biasing member configured to bias the first clamping member relative to the first sub member in the fourth pivot direction,
the first biasing member including
a first end configured to engage with the pedal body, and
a second end configured to engage with the first clamping member, and
the second biasing member including
a third end configured to engage with the first sub member, and
a fourth end configured to engage with the first clamping member.

10. The bicycle pedal according to claim 9, wherein
the second biasing member is configured to apply a biasing force to the first sub member at a third point defined between the third end and the first sub member,
the second biasing member is configured to apply a biasing force to the first clamping member at a fourth point defined between the fourth end and the first clamping member, and
a distance between the first pivot axis and the third point is shorter than a distance between the first pivot axis and the fourth point.

11. A bicycle pedal comprising:
a pedal axle;
a pedal body rotatably supported on the pedal axle about a rotational axis;
a first sub member movably coupled to the pedal body, the first sub member being movable relative to the pedal body about a first pivot axis in a first pivot direction and a second pivot direction opposite to the first pivot direction;
a first clamping member movably coupled to the first sub member, the first clamping member being movable relative to the first sub member about a second pivot axis substantially parallel to the first pivot axis in a third pivot direction and a fourth pivot direction opposite to the third pivot direction;
a second clamping member coupled to the pedal body to clamp a cleat together with the first clamping member; and
a biasing structure configured to bias the first clamping member in the fourth pivot direction and the first sub member in the second pivot direction, the first pivot axis being closer to a point on the pedal axle than the second pivot axis when viewed from an axial direction parallel to the first pivot axis,
the first clamping member including a first cleat engagement portion configured to engage the cleat in a state where the first clamping member and the second clamping member clamp the cleat,
the second pivot axis being closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis,
the biasing structure including
a first biasing member configured to bias the first clamping member relative to the pedal body in the fourth pivot direction, and
a second biasing member configured to bias the first clamping member relative to the first sub member in the fourth pivot direction,
the biasing structure including a biasing support configured to support the second biasing member to be pivotable relative to the first sub member about a biasing pivot axis.

12. The bicycle pedal according to claim 11, wherein
the biasing pivot axis is substantially coaxial with the first pivot axis.

13. The bicycle pedal according to claim 11, wherein
the biasing support includes
a movable part spaced apart from the biasing pivot axis, and
a pivot part configured to pivotably support the movable part relative to the pedal body about the biasing pivot axis, and
the second biasing member is mounted to the movable part.

14. The bicycle pedal according to claim 13, wherein
the movable part is provided between the pedal axle and the second pivot axis when viewed from the axial direction parallel to the rotational axis.

15. The bicycle pedal according to claim 13, wherein
the movable part is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

16. The bicycle pedal according to claim 13, wherein
the third end of the second biasing member includes a contact part configured to contact the first sub member, and
the contact part is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

17. The bicycle pedal according to claim 13, wherein
the pivot part is configured to be pivotably connected to the pedal body.

18. The bicycle pedal according to claim 13, wherein
the biasing pivot axis is closer to the first cleat engagement portion than the second pivot axis when viewed from the axial direction parallel to the rotational axis.

19. The bicycle pedal according to claim 13, wherein
when viewed from the axial direction parallel to the rotational axis, the second pivot axis is disposed within an outline of the second biasing member in a state where the first clamping member is disposed at a rest position where the first clamping member is free from a force from the cleat.

20. The bicycle pedal according to claim 18, wherein
the third end of the second biasing member includes a contact part configured to contact the first sub member, and
the contact part is closer to the first cleat engagement portion than the first pivot axis when viewed from the axial direction parallel to the rotational axis.

21. The bicycle pedal according to claim 1, wherein
the pedal body includes a restricting portion configured to restrict the first sub member from moving relative to the pedal body in the second pivot direction.

22. A bicycle pedal comprising:
a pedal axle;
a pedal body rotatably supported on the pedal axle about a rotational axis;
a first sub member movably coupled to the pedal body, the first sub member being movable relative to the pedal body about a first pivot axis in a first pivot direction and a second pivot direction opposite to the first pivot direction;
a first clamping member movably coupled to the first sub member, the first clamping member being movable relative to the first sub member about a second pivot axis substantially parallel to the first pivot axis in the third pivot direction and the fourth pivot direction;
a second clamping member coupled to the pedal body to clamp a cleat together with the first clamping member;
a first pivot shaft defining the first pivot axis;
a second pivot shaft defining the second pivot axis, the second pivot shaft being attached to the first sub member to pivotably support the first clamping member about the second pivot axis; and
a biasing structure configured to bias the first clamping member in the fourth pivot direction and the first sub member in the second pivot direction,
the first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure being configured such that the first sub member is moved relative to the pedal body about the first pivot axis in the first pivot direction in a state where a first force to move the first clamping member in the first pivot direction is applied to the first clamping member, and
the first sub member, the first pivot axis, the first clamping member, the second pivot axis and the biasing structure being configured such that the first sub member stays or is moved relative to the pedal body about the first pivot axis in the second pivot direction in a state where a second force to move the first clamping member in the third pivot direction is applied to the first clamping member, the first force directing in a direction different from a direction of the second force.

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